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GLACIERS OF PRINCE WILLIAM SOUND AND THE SOUTHERN PART OF THE KENAI PENINSULA, ALASKA

II.—GLACIERS OF PORT WELLS, PRINCE WILLIAM SOUND*

BY

U. S. GRANT AND D. F. HIGGINS

COLLEGE FIORD

Pushing westward from Unakwik Inlet and the Meares Glacier one makes his way through the picturesque passage between Esther Island—a bold mountainous mass of granite—and the mainland into the waters of Port Wells (Fig. 1). Port Wells with its two large arms, College and Harriman fiords, forms the extreme northwestern part of Prince William Sound. The valley in which Port Wells lies is a very extensive one, reaching from the front of the Harvard Glacier south-southwest through Cochrane Bay to the head of Port Nellie Juan, a distance of 56 miles at sea level. The same straight depression is continued for an unknown distance both north-northeast and south-southwest of the points named. On the east side of College Fiord, two or three miles inland, one sees the Amherst and Crescent glaciers which, from the water, appear to be the same as when they were photographed by the Harriman Alaska Expedition in 1899. About the head of College Fiord (Fig. 2) clusters a group of large and exceedingly interesting glaciers. Most of these were named by the Harriman Alaska Expedition after various colleges, and we have added similar names (Williams, Dartmouth,

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The first article in this series appeared in the *Bulletin*, Vol. 42, 1910, pp. 721-738. A general map of Prince William Sound, showing the location of the various fiords and bays noted below, accompanied that article.

Holyoke, Barnard, and Baltimore) to the larger remaining glaciers. Along the western side of College Fiord is a lofty mountain range, the prominent peak at the south end of which is named in honor of Professor B. K. Emerson who visited this district in 1899.

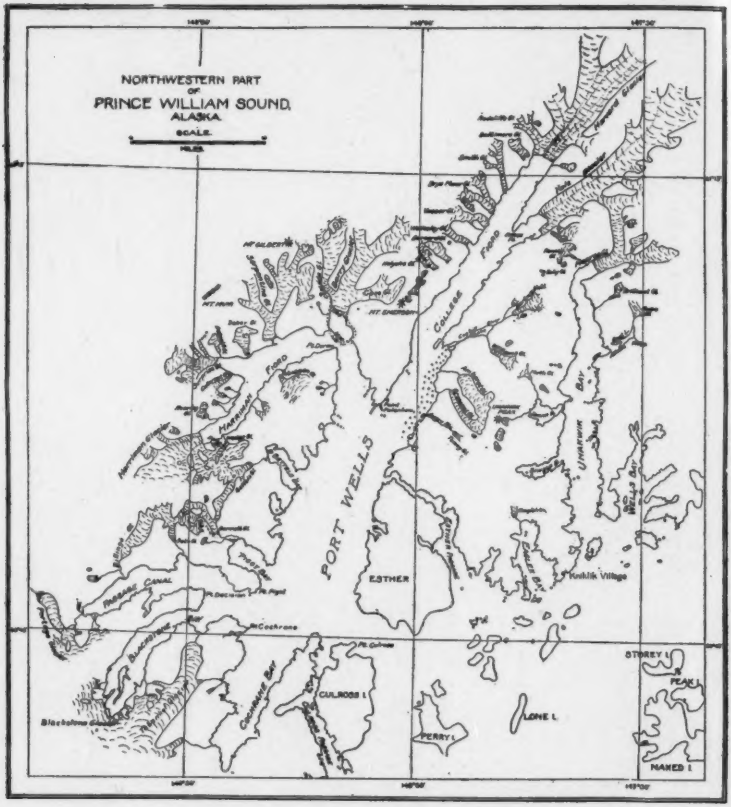

FIG. 1—Map of the northwestern part of Prince William Sound, July, 1909. Scale, approximately, 12 miles to 1 inch.

YALE GLACIER

The first account of the Yale Glacier was written by Mendenhall* in 1898. In 1899 the glacier was visited by the Harriman Alaska Expedition and described by Gilbert.† In 1905 we made a

* Mendenhall, W. C., A Reconnaissance from Resurrection Bay to the Tanana River, Alaska, in 1898: 20th Ann. Rep. U. S. Geol. Survey, pt. 7, 1900, pp. 273, 325.
† Harriman Alaska Expedition, vol. 3, 1904, p. 83.

hasty visit to the east arm of College Fiord, and in 1909 spent about half a day in the vicinity of the Yale Glacier.

Notes and photographs by both Mendenhall and Gilbert compared with observations made in 1909 show that there has been no

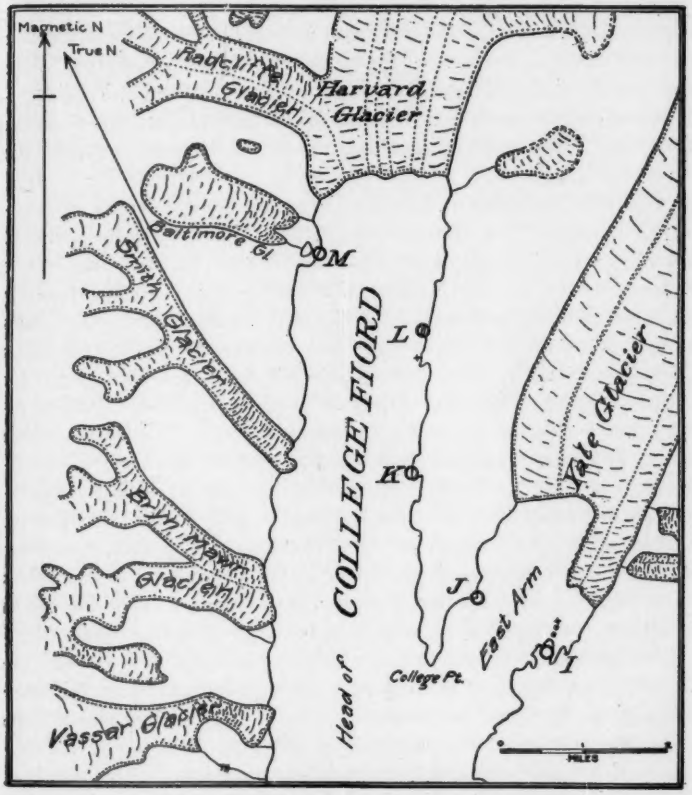

FIG. 2.—Map of the head of College Fiord, July, 1909. The points marked by circles are stations from which photographs were taken.

marked advance at the edges of the ice front since 1898, but the eastern side of the glacier was slightly farther advanced in the later year. Gilbert says, "The trough in which it [the glacier] lies is forested along the water edge on both sides for the greater part of the distance from the main fiord to the glacier, but barren in the immediate vicinity of the glacier. There are straggling trees high on the valley wall at the end of the glacier, but they do not come down close to the ice." This was the condition of affairs at the time of

our visit in 1909, excepting that there was a very narrow bare zone on each side of the glacier. On the east side the ice is separated from grass and alders by but a few rods of rock débris. Possibly these narrow bare areas are due to no more than the rapid melting away of the ice in the summer. Although the sides of the fiord are barren of trees they are clothed with a tangle of salmonberry bushes and alders up to the line where the scattering timber begins. This line is very distinct on each side of the fiord. It is practically horizontal at an elevation of 900 feet (estimated) and probably marks the lateral margin of the great ice stream which once occupied the entire fiord.

The published maps show the front of the glacier as approximately straight, but intersections on the front in 1909 showed that the east part of the glacier projects farther than the west part. The former portion is held in place by a hard ledge of rock extending about parallel with the axis of the glacier. Figures 2 and 4 show this feature of the front as well as portions of the rock peeping out from under the ice cliff. This ledge shows distinctly in a photograph by Curtis in 1899. The tiny islands in the foreground are gull rookeries and belong to the same hard rock layers. The station from which this view was taken is on a glaciated knob of the same resistant formation. Careful examination of the Harriman Expedition photographs shows that the ice front was then probably as now. The irregular shape may have been overlooked in a rather cursory survey, for we have noticed that in a perspective view ice fronts are very deceiving and that a seemingly straight wall of ice often shows very unexpected variations when more closely examined.

The growth of a mature alder thicket close down to the ice indicates that the glacier front is now close to its maximum advance in a period of perhaps 50 or more years. The gravelly point a mile below the glacier on the east side of the fiord is probably the remains of an older terminal (recessional) moraine. This moraine, however, is younger than the time of greater ice extension indicated by the lower limit of the spruce forest about 900 feet above sea level.

Harvard Glacier

The Harvard Glacier is the trunk glacier of College Fiord and is the largest and most impressive of that inlet. The glacier has several feeders and 6 distinct medial moraines, as well as other less distinct drift accumulations on its surface. The frontal cliff is estimated to be 350 feet in height and at the times of our visits was discharging abundantly, the water down as far as College Point car-

rying much ice. Waves generated by the fall of icebergs and the strong currents in front of the glacier make it impracticable to approach near the glacial front in a small boat. Reports are current that the native seal hunters in bidarkas have been drawn under the glacier by northward flowing currents. At the time of our visit in 1909 there were marked northward-flowing currents on both sides of the fiord near its upper end. The head of the Harvard Glacier is in lofty mountains far back from the glacial front. The most distant of these mountains were roughly estimated, by intersection of small angles, to be about sixty miles from the frontal cliff of the glacier.

The Harvard Glacier was visited by the Harriman Alaska Expedition in 1899.* We saw and photographed the glacier at a distance in 1905 and at close range in 1909. Gilbert's description of the Harvard Glacier calls attention to the relation of this to the southernmost feeder on the west, the Radcliffe Glacier, and notes that the two barely coalesced in 1899 and that the medial moraine of the feeder extended without curvature to the frontal cliff. A photograph taken in 1905 shows that practically the same conditions prevailed at that date. In 1909, however, this medial moraine was distinctly curved (as Gilbert predicted, should the glaciers advance) and it followed the general axis of the trunk stream for half a mile before reaching tide water (Fig. 5.) Thus the position of the west side of the front of the Harvard Glacier was approximately the same in 1899 and 1905, but there was an advance previous to July 1, 1909, at which time the ice front is estimated to have been half a mile farther south than on the earlier dates.

Gilbert reports, from a study of photographs, that in 1899 the eastern side of the front of the Harvard Glacier was 1,000 to 2,000 feet north of the apex of an alluvial fan made by a stream from a small hanging glacier. A photograph taken 10 years later, compared with his statements and photograph,† indicates that in 1909 the eastern side of the glacial front was farther advanced than in 1899, roughly estimated at a quarter of a mile.

Bryn Mawr Glacier

On the west side of College Fiord is a series of beautiful small glaciers (Figures 1 and 2) which fed the great ice stream which once occupied the whole fiord. Four of these,—the Smith, Bryn Mawr, Vassar, and Wellesley glaciers,—now reach tide water,

* Harriman Alaska Expedition, vol. 3, 1904, pp. 84, 86, 89.
† Harriman Alaska Expedition, vol. 1, 1901, pl. facing p. 72.

while the others end high up on the rocky wall of the fiord. The Bryn Mawr Glacier is the largest and the most attractive of those on the west side of College Fiord. It is a veritable ice cascade, and the impression of a rushing torrent is ever present to one who views the glacier from directly in front and at short range (Fig. 6). The glacier is formed by two trunk streams which unite about a mile back from tide water. The two streams flow in a deep valley of fairly gentle slope, but just before joining they plunge over a steep slope. Below this the glacier has a gentle gradient for about half a mile and then another and still more tumultuous fall leads nearly to tide water, before reaching which the glacial profile flattens again

FIG. 3—East side of front of Yale Glacier from Point I (Fig. 2), July 1, 1909. This photograph and Fig. 4 were taken from the same point and together form a panorama of the Yale Glacier.

on the floor of College Fiord. Below the crest of the upper fall the glacier lies in a very shallow trough. The crests of these ice falls are thought to represent the approximate upper limits of the trunk glacier of College Fiord at two earlier stages in its history; and the Bryn Mawr Glacier of today occupies a hanging valley on the side of this fiord. Similar characters are shown by other glaciers of College Fiord and their significance has been noted by Gilbert.*

A comparison of the photographs taken in 1899† with those taken in 1909 indicates that the glacier was farther advanced at the latter date and that its front (especially the southern half of the front) deployed more widely on the shallow bottom of College

* Harriman Alaska Expedition, vol. 3, 1904, pp. 86-88, 175-6.

† See also Harriman Alaska Expedition, vol. 2, p. 276, and vol. 3, frontispiece.

Fiord. A photograph taken in 1905 (Fig. 6) and an impression gained four years later indicate that the glacier was less advanced at the earlier date, and that it was then (1905) at approximately the same position as in 1899. Any close estimate of the actual amount of this advance (as recorded in the photographs taken in 1909) is impracticable from the data at hand, but it is probably as much as 500 feet.

HARRIMAN FIORD

The first recorded visit to Harriman Fiord was made by the Harriman Alaska Expedition in 1899 and the main glaciers were named by the members of that expedition. (See Fig. 7.) Previous

FIG. 4—West side of front of Yale Glacier from Point I (Fig. 2), July 1, 1909. Point I is a small round rock knob, rising 30 to 40 feet above the water; this knob is part of a resistant stratum which forms the small point in the right-hand foreground of the photograph and also the small rock masses just projecting from under the front of the glacier.

to that date the Barry Glacier, lying at the sharp bend in the fiord, was the only one which had been recorded, and earlier explorers evidently assumed that this ice stream filled the whole end of this arm of Port Wells. That this glacier has not, however, extended across the fiord for a long series of years is shown by the vegetation, including a sparse forest, coming down nearly to the water's edge opposite this glacier; and by well authenticated reports that native seal hunters had repeatedly gone past the front of the Barry Glacier and into the inner part of the fiord. To the Harriman Expedition is, however, due the credit of bringing to public knowledge this magnificent fiord hemmed in by lofty mountains whose sides

and valleys carry many glaciers. Five of these ice streams reach tide water.

Of the points of scenic interest in Alaska, as far as the glaciers are concerned, three stand out prominently—Glacier Bay, the Yakutat-Disenchantment Bay region, and Harriman Fiord. The panorama of mountain, ice, snow, and water which unfolds itself from points along the southeastern shore of Harriman Fiord has few equals anywhere in the world.

The most striking peaks about the fiord are Mt. Gilbert on the north and a four-peaked summit, Mt. Muir, on the west of the Serpentine Glacier. A rough estimate, made by vertical angles, of the

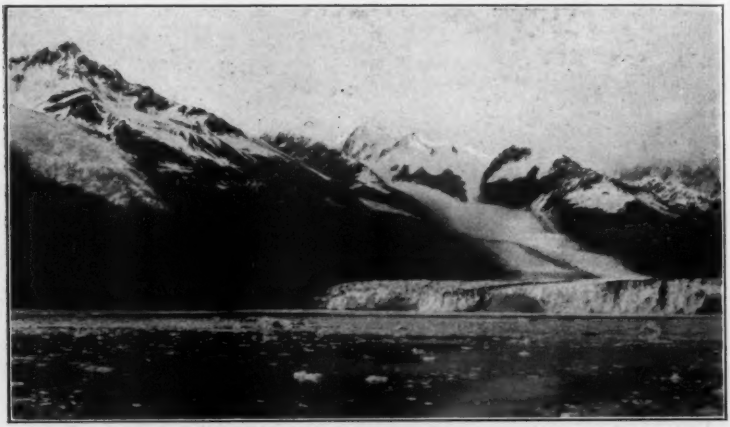

FIG. 5—Western part of front of Harvard Glacier, showing its southernmost feeder (the Radcliffe Glacier). The photograph was taken from Point L (Fig. 2), on July 1, 1909. The western medial moraine of the Harvard Glacier is the continuation of the medial moraine of the Radcliffe Glacier.

altitudes of these gave results approximating 10,000 feet in each case. These peaks are named after Grove Karl Gilbert, geologist on the U. S. Geological Survey, and John Muir, the veteran naturalist, both of whom were among the first scientists to see Harriman Fiord.

The records of the fluctuations of the glaciers in Harriman Fiord are unfortunately fragmentary. Gilbert's descriptions are mainly from a study of photographs and the accounts of others.* Our photographs taken in 1905 were few, and in 1908 time permitted only a hurried view of the Barry Glacier. In 1909 a little more

* Op. cit., pp. 89-97.

time was spent in Harriman Fiord, but very much less than the locality deserves. Sufficient data are at hand, however, to show that the Barry and the Surprise glaciers have retreated markedly in the last 10 years, while the Serpentine, Cataract, Harriman, and Toboggan glaciers have shown much less change in that time.

Barry Glacier

The Barry Glacier is in some ways the most interesting in Harriman Fiord and there is a more complete record of its fluctuations

Fig. 6—Bryn Mawr Glacier, Aug. 21, 1905.

than of any other in Port Wells. In 1899 the front of the glacier was well out into the waters of Harriman Fiord, and ten years later this glacier showed a much greater retreat than any other of the glaciers we have studied. From 1899 to 1909 the Barry Glacier retreated a distance of approximately 2.1 miles measured along the axis of the glacier (Fig. 7). From 1899 to 1905 the retreat was 1.2 miles; from 1905 to 1908, .4 mile; and from Aug. 11, 1908, to June 29, 1909, .5 mile. In 1899 there was a long point of ice extending

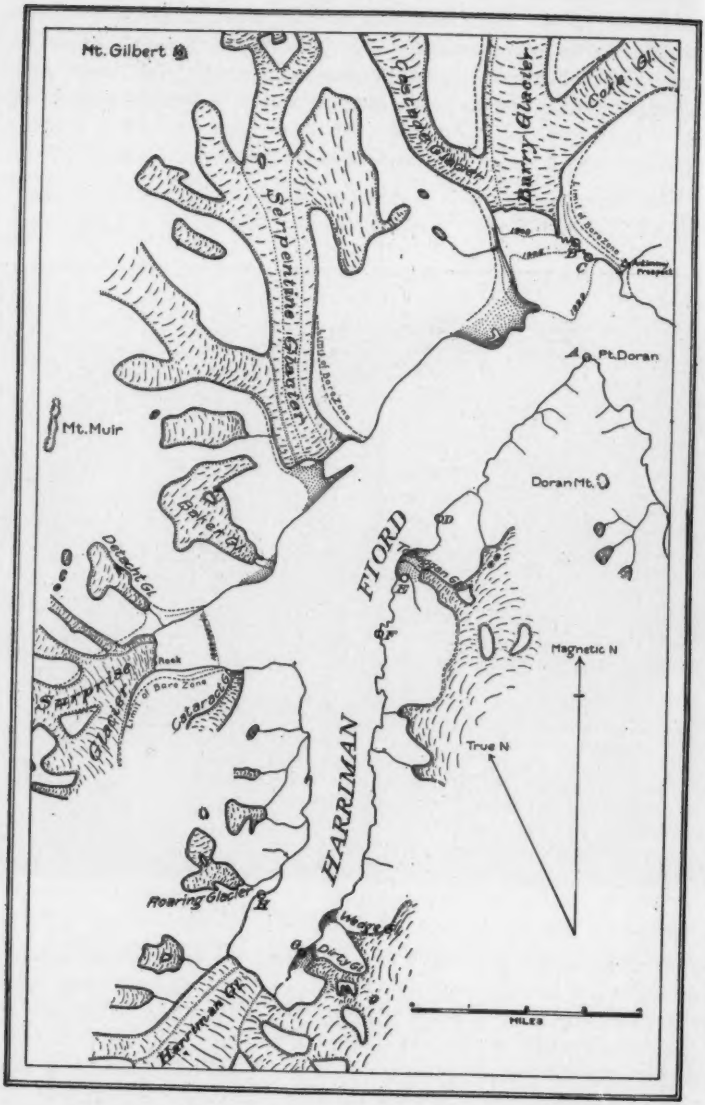

FIG. 7.—Map of the upper part of Harriman Fiord, June 29 and 30, 1909. The points marked by circles are stations from which photographs were taken.

forward from the east side of the glacial front; in 1905 there was a similar one from the west side; and in 1909 a shorter one extended forward from the east side. The two earlier points of ice were probably in the main unmelted stagnant portions of the glacier resting mostly above tide level, but the 1909 projection was part of the moving glacier.

Along both sides of the Barry Glacier there is an extensive bare zone between the ice and a mature spruce forest. (Part of this bare zone is shown in Fig. 8.) Near the antimony prospect southeast of the glacier there are fragments of trees in the drift, and near the southern limit of the bare zone at this locality are a number of

FIG. 8—Western side of trough of the Barry Glacier from Point C (Fig. 7), June 29, 1909. The western part of the front of the glacier is shown on the right; and on the left is a waterfall in a stream which comes from a hanging valley in which is a small glacier. In 1899 the front of the glacier was a mile and a half beyond (to the left of) this waterfall; in 1905 a quarter of a mile beyond; in 1908 about half way between the waterfall and the present position of the glacial front.

fallen trunks. The limit of this bare zone marks the maximum advance of the ice since the growth of the present forest. The ice probably stood near this point of maximum advance for some time during which was deposited the morainic accumulations on the west side of the bay in which is the glacier. No definite data establishing the date of the end of this maximum advance are available, but the condition of the forest above the bare zone and the vegetation on the morainic deposits just mentioned would indicate that such a maximum occurred some years ago, probably 25 or more. Still more advanced positions of the ice front have not occurred for probably a few centuries. The glacier had retreated from this maximum position when it was first studied (1899).

FIG. 9—Serpentine Glacier from Point D (Fig. 7), June 29, 1909. The main part of this glacier lies in the apparently low valley on the right side of the photograph.

FIG 10—Baker and Detacht Glaciers, the latter on the left, from Point F (Fig. 7), June 29, 1909. The highest peaks (Mt. Muir) to the right of the center are approximately 10,000 feet above the sea in the foreground.

The position of the west side of the ice front in 1909 with reference to the first feeder (Cascade Glacier) and the prominent waterfall from the hanging valley near the north end of the forested zone will assist in recording the amount of future fluctuation of this glacier (Fig. 8).

Serpentine Glacier

The Serpentine Glacier is the first to reach tide water west of the Barry Glacier (Figs. 7 and 9.) A considerable bare zone, not covered by vegetation, along the sides of the Serpentine Glacier, and morainic accumulations in front of the glacier are evidences of an advance in comparatively recent years, but previous to 1899. The bare zone on the side is underlain by a considerable lateral moraine deposited at the time of this advance. This glacier had an advance a few years before 1899; in 1905 the position of the front of the ice was approximately the same as in 1899; and in 1909 the ice front was farther back than at either of the other dates. The retreat from 1905 to 1909 is perhaps a quarter of a mile, and from the advance before 1899 to the present the glacier has retreated approximately half a mile on its center and eastern side and three-quarters of a mile on its western side. These distances are to be regarded only as estimates, for we did not study the front of this glacier at close range and most of our information comes from photographs.

Baker Glacier

The Baker Glacier is named after Dr. Marcus Baker, editor of the Geographic Dictionary of Alaska.* The névé and the ice stream of this glacier are practically one and nearly the whole glacier is shown in Figure 10. The surface of the Baker Glacier has a steep slope but near the sea the ice stream breaks over an almost vertical cliff from which the ice falls and accumulates near tide water. A small tongue of the glacier does, however, pass over this cliff and joins the ice below. These features can be seen in Figure 10, which shows the conditions in 1909. In 1905, however, there was no ice at the base of the cliff, the small tongue of the glacier came downward for only a short distance from the top of the cliff, and the ice front above the cliff was not so high and so prominent as in 1909. The photographs to which we have access, taken in 1899, show that conditions then were very similar to those in 1909, but no front view of the glacier at the earlier date is available.

* *Bull.* U. S. Geol. Survey No. 187, 1902, and No. 299, 1906.

The Baker Glacier then shows a retreat between 1899 and 1905, and in 1909 the ice had advanced to and quite probably beyond its position of ten years earlier. Data are not at hand to measure the amount of this retreat and advance, but the distance is probably only a few hundred feet.

In the study of these glaciers and mountains in the field, and also from photographs in the office, one finds it constantly necessary to enlarge his conceptions of distances and elevations. The glaciers, when seen both in the field and also in photographs, appear to be much shorter and so proportionally wider than they really are, and distant mountains seem to be very close at hand. It is not until one tries to make a plane table map of these glaciers and mountains and

FIG. 11—Surprise Glacier from Point F (Fig. 7), June 29, 1909. Detacht Glacier is on the extreme right of the photograph.

determines, by intersections, their locations and sizes that he gets a reasonably accurate conception of the distances. In the photograph here reproduced as Figure 10, the shore line is two miles, and the highest peaks (Mt. Muir) just to the right of the center are seven miles from the observer and the tops of these peaks are approximately 10,000 feet above the sea in the foreground.

SURPRISE GLACIER

The Surprise Glacier reaches tide-water in a vertical cliff at the head of the west arm of Harriman Fiord. Along both sides of the glacier is a bare zone which extends forward nearly to the Cataract Glacier. Gannett's map of Port Wells* shows the front of the Sur-

* Harriman Alaska Expedition, vol. 3, 1904, pl. 13.

prise Glacier practically at the point where the Cataract Glacier reaches tide-water. Photographs taken that year (1899), however, show that the two glaciers were separated by a distance which is estimated to be a quarter of a mile. In 1909 the front of the Surprise glacier was much farther (estimated at 1.1 mile) back than in 1899. How much of this retreat had taken place since 1905 is not clear, for our photograph of that year is indistinct but it is certain that a considerable part of the retreat had occurred by 1905. A rock ledge, divided into two parts, projected from the front of the glacier near its south side in 1909 (Fig. 11). Evidently this ledge would be covered by a slight advance of the ice, at least so it appeared from opposite the front of the Cataract Glacier, our point of

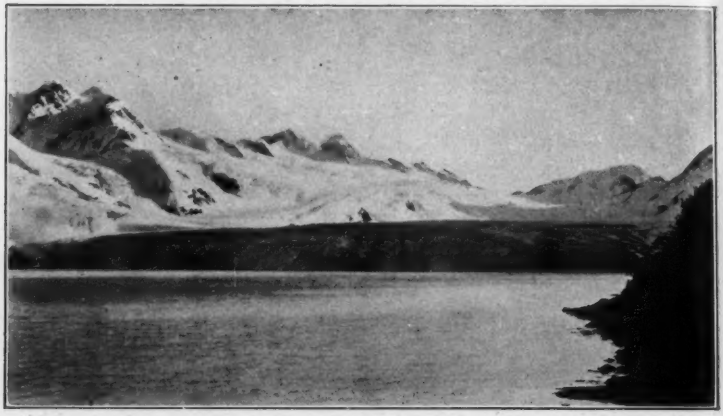

FIG. 12—Front of Harriman Glacier from Point F (Fig. 7), June 29, 1909.

observation nearest the Surprise Glacier. It is our recollection that no such ledge was visible in 1905.

The maximum advance of the Surprise Glacier in recent years is indicated by the bare zone, and by 1899 the glacier had retreated about a tenth of a mile. This retreat was continued in 1905, and by 1909 the glacier had retreated 1.1 miles from its position in 1899.

HARRIMAN GLACIER

The Harriman is the trunk glacier of Harriman Fiord and comes to tide level at the southwest end of this body of water. The frontal cliff is estimated to be 300 feet in height. The glacier has several feeders and comes from an extensive and unexplored snow field

from which only a few snowless peaks emerge. Even in summer these mountains still retain most of their snow mantle (Fig. 12).

Photographs of the eastern side of the front of the Harriman Glacier taken from Point H (Fig. 7) in 1905 and 1909 show that this side of the glacier retreated approximately 700 feet between these dates. A comparison of an 1899 photograph* with the above indicates that between 1899 and 1905 the east side of the glacier retreated about half the above distance. As the two photographs were not taken from the same point this estimate of the retreat between 1899 and 1905 is only approximate. On the west side of the

FIG. 13—Toboggan Glacier, Aug. 20, 1905. The low mounds in the foreground represent a moraine formed by a very recent advance of the ice when it reached practically to tide water.

ice front a careful examination in 1909 of the glacier from the position of a photograph† taken in 1899 showed no noticeable difference in the position of the glacial front. In 1899 a considerable embayment existed in the eastern third of the front of this glacier, but was not present in 1905 and 1909.

* Harriman Alaska Expedition, vol. 3, 1904, pl. 15, upper figure.

† Idem, pl. 15, lower figure.

Toboggan Glacier

The Toboggan Glacier is a small ice stream coming from a considerable snow field which lies in the northern part of the peninsula separating Harriman Fiord from the lower part of Port Wells. This glacier has a marked bare zone along its sides and its end deploys on a flat not far above sea level (Fig. 12). We visited this glacier on August 21, 1905, and on June 29, 1909. At the earlier date a small cairn was built on the north end of the first and most northerly projecting rock ridge on the right side of the valley as it is approached from tide-water. In 1905 the center, or most advanced part of the glacier, was 723 feet, as determined by pacing, distant from the cairn, whose location is shown on Figure 7 (Point E). Just at the extreme front of the ice at this date was a low rock ridge crossing the valley. In 1909 the most advanced part of the glacier was 252 feet farther back than in 1905. However, in 1909 a freshly deposited low moraine in the northern half of the plain in front of the glacier indicates that the ice sometime between 1905 and 1909 had been about 400 feet in advance of its position at the earlier date. The map of 1899* shows that the glacier did not reach tide water at that time, but the lack of vegetation on the bare zone at the side of the glacier and on the flat in front of it in 1905 (Fig. 12) shows that the ice front has occupied an advanced position, reaching practically to tide water, at a very recent date, possibly but not probably later than 1899.

* Harriman Alaska Expedition, vol. 3, 1904, pl. 13.

THE ESTABLISHMENT OF MICHIGAN'S BOUNDARIES: A STUDY IN HISTORICAL GEOGRAPHY

BY

GEORGE J. MILLER

A study of the boundaries of most States would reveal many interesting problems in historical geography. In some cases a misconception of the geography of a region led to the confirmation of odd boundaries. In other cases the natural boundary was disregarded. The position of Michigan among the Great Lakes and the importance of lake frontage to adjoining States made the establishment of its boundaries a national affair. They represent a compromise and created in Michigan two economic units having very unlike interests.

Territory of Michigan Established

By the treaty of Paris in 1783 the United States obtained title to that portion of the Great Lakes region lying south of the Canadian boundary, though it was occupied by the British until 1796. A number of Eastern States promptly advanced claims to large parts of the territory. Yielding to public opinion, however, they soon surrendered these claims to the Confederation, and in 1787 all the land north of the Ohio River and east of the Mississippi was organized as the Northwest Territory. Article 5 of the ordinance provided that "there shall be formed in the said territory not less than three nor more than five States," and defined the boundaries of the three proposed States. The same article provided that "the boundaries of these three States shall be subject so far to be altered, that, if Congress shall hereafter find it expedient, they shall have authority to form one or two States in that part of the said territory which lies north of an east and west line drawn through the southerly bend of Lake Michigan." When any of the said States should be established, the northern boundaries of Ohio, Indiana, and Illinois were to be definitely marked according to the terms of the ordinance.

By an Act of Congress in 1805 the territory of Michigan was defined more definitely on the west by "a line drawn from the said southerly bend (of Lake Michigan) through the middle of said lake to its northern extremity (Fig. 1), and thence due north to the northern boundary of the United States."* The southern boundary remained as defined in the ordinance, and the Territorial Government was established with these as boundaries.

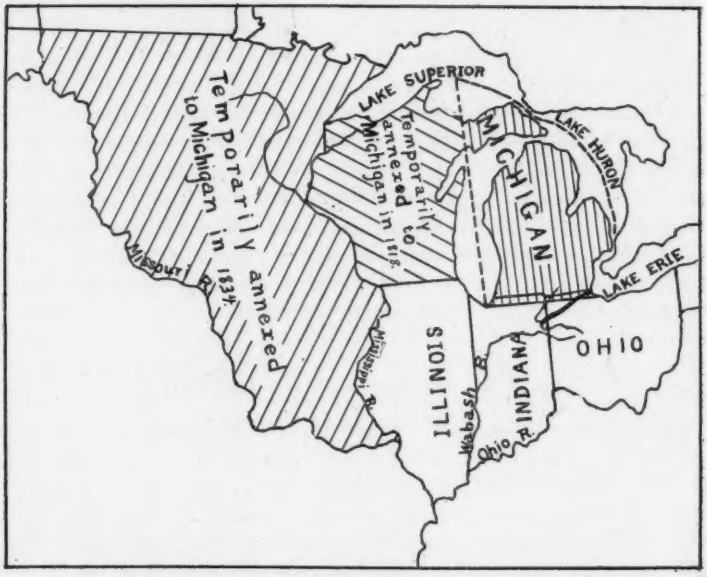

FIG. 1—Territory over which the jurisdiction of Michigan has extended—1805, 1818, 1834. Mich. Pioneer and Hist. Soc. Coll., Vol. 27, p. 348.

OHIO AND INDIANA SOUGHT MICHIGAN TERRITORY TO GAIN LAKE PORTS

Michigan's history within definite limits begins here. The territory soon was involved in a serious struggle to maintain the integrity of its domain, as both Indiana and Ohio sought valuable portions. The division of the territory was based on Mitchell's map of 1775 (Fig. 2), which set forth the best-known information of the geography of the region. According to this map, a due east and west line through the southern bend of Lake Michigan intersected the in-

* Sen. Doc. 211, p. 20, 24th Cong., 1st. Sess., Vol. 3.

ternational line north of Lake Erie, giving the ports of that lake to the area which became Ohio, and deprived both Indiana and Illinois of a lake port. A later map of the region (Fig. 3) brought out the fact that Toledo and Monroe Harbors belonged to Michigan.

The Harbor of Monroe was of small importance compared with that of Toledo, and Ohio people supposed that the latter fell within

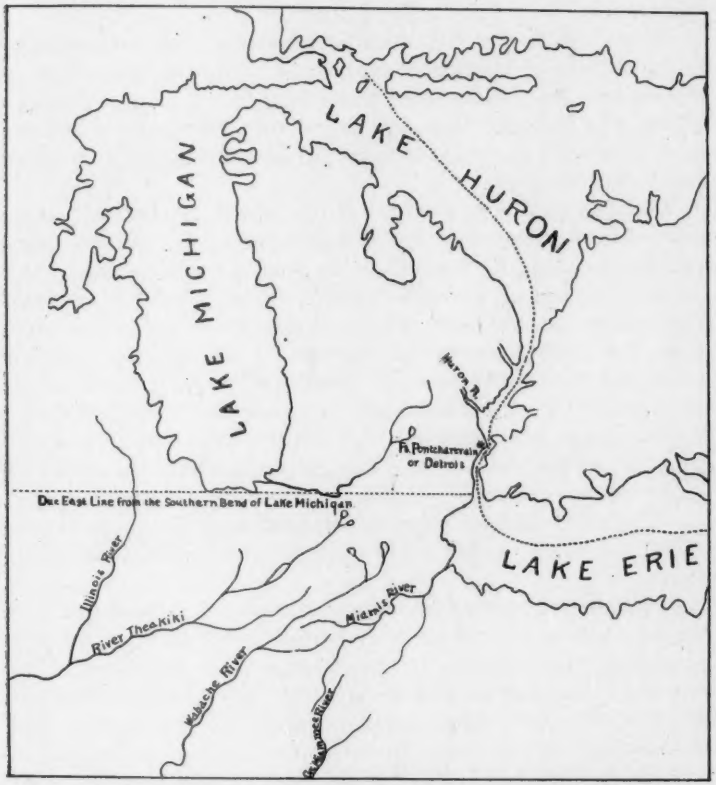

FIG. 2—Mitchell's Map of 1755. Sen. Doc. 211, p. 16, 24th Cong., 1st Sess., Vol. 3.

their limits. This was reported not to be the case when the convention was in session to form their State constitution.* Realizing that they would lose practically their entire lake front if the southern bend of Lake Michigan lay as far south as reported, they inserted a

* Historical Transactions of Ohio, Vol. 1, pp. 77, 116.

clause in their constitution defining their northern boundary as a line running from the southern bend of Lake Michigan to the northern point of Maumee Bay* (Fig. 3). This was to be the boundary if the report was true, and Congress assented. Congress accepted the constitution proposed for Ohio, and admitted the State to the Union, but did not give its formal consent to the boundary.† Ohio, however, claimed the area thus shorn from Michigan and attempted to govern it.

When Indiana presented itself for admission, Congress consented to the shifting of Michigan's southern boundary ten miles north of the southern bend of the lake,‡ thus taking from it another port and giving it to Indiana. This port was of vital importance to Indiana as it afforded water transportation at the north in addition to its facilities at the south.

Michigan gave little attention at the time to the Indiana matter other than to protest the precedent,§ as the area was unsettled. Such was not the condition, however, in the southeast about Toledo. The active settlement of Michigan began from the vicinity of Maumee Bay and Detroit, and nearly all the population was still in that quarter. The leading commercial interests of the territory centered there, and when Ohio asked for admission, Wayne County, which then included all the southeastern part of the State, protested vigorously against being left out. They felt that their business interests would be served better by the State government, than they could be if left within a territory.‖ The leading men of Michigan, however, had its future somewhat planned, and fortunately their counsel prevailed in Congress, and Wayne County remained a part of the territory.

Michigan had commercial interests at stake. A railroad had been started which was to terminate at Toledo, and to transfer this port to another State was to Michigan unreasonable and illegal. The men most interested aroused the spirit of State patriotism until the people were ready to fight for the strip which had, thus far, belonged to them.

Ohio claimed that Toledo was the "key" to the west and must

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* Constitution of Ohio, Article 7, Sec. 6.

† *Sen. Doc.* 354, pp. 13–18, 23rd Cong., 1st Sess., Vol. 4.

‡ *State Papers*, No. 3, p. 30, 14th Cong., 2nd Sess.
Sen. Jour. 14th Cong., 2nd Sess., pp. 27–28.

§ *Memorial* of the Governor and Judges, 1818, Archives of State Dept., of Mich. Cited by A. M. Soule: Pub. Mich. Pioneer and Hist. Soc., Vol. 27, p. 342.
Sen. Jour., 15th Cong., 1st Sess., p. 180.

‖ Statutes of Ohio, Vol. 3, p. 2096.
St. Clair Papers, Vol. I, pp. 228–229; Vol. II, pp. 543–580.
Burnet: Notes on the Early Settlement of the Northwest Territory, pp. 337–494.

be included within its boundaries. This, of course, was an equally strong reason why Michigan should not surrender it. Congress had for years given aid to internal improvements in Ohio. One of the greatest of these projects was the Wabash and Erie Canal (Fig. 3).

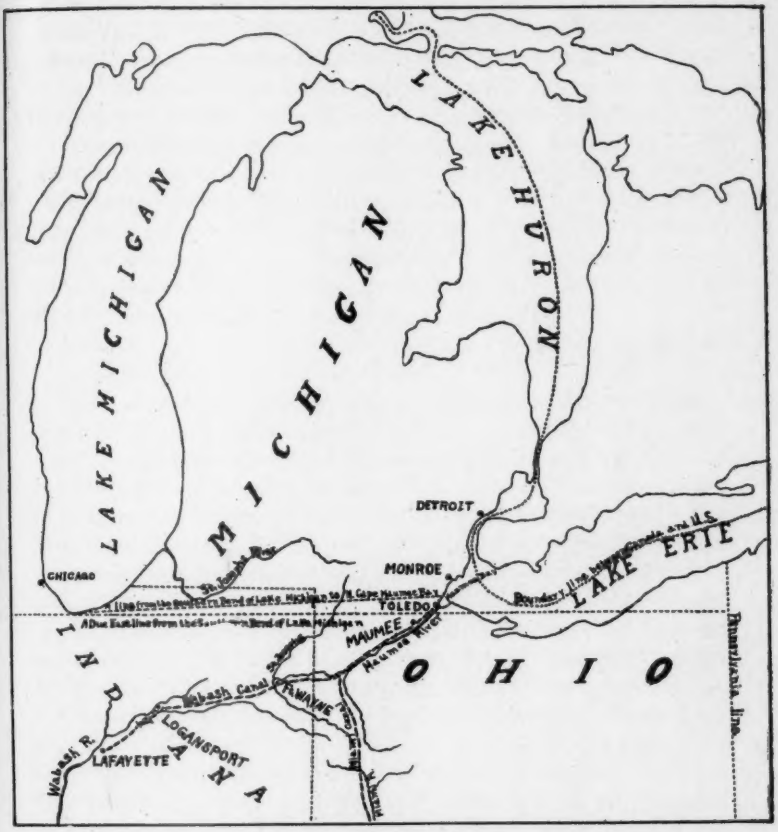

FIG. 3—Relative position of Lake Erie and Michigan. From Sen. Doc. 211, p. 16, 24th Cong., 1st Sess., Vol. 3.

It was now pointed out that this canal would terminate in Michigan unless the claims of Ohio were maintained.

The importance of Toledo in the minds of the business men of the day may be summarized as follows: (1) It had a good harbor. The estuary of the Maumee River formed a harbor that, for the relatively small boats of the day, was thirteen miles long and had

a navigable channel about 100 rods in width.* (2) It was held to be the nearest port for an area as large as Massachusetts and Connecticut combined, and with more than double their producing capacity of food and raw materials.† (3) Most of the people of Michigan and of Upper Canada passed through it in their intercourse with Ohio, Pennsylvania, and Virginia.‡ (4) It was nearer than any other town on Lake Erie to the gathering point of northwestern commerce—the southern bend of Lake Michigan.‡ (5) It was nearer than any other lake town to Cincinnati the chief city of the Ohio valley.‡ (6) A proposed canal system was to center at Toledo. This system was to be 663 miles long and to pass through a rich region.‡ (7) It would be an important distributing point for the manufactures of the East and Europe. The canals would give it a hinterland of 100,000 square miles.§ (8) Water power would be supplied from the canals, and coal could be obtained cheaply.‖

Toledo Harbor, Statehood, and National Politics

Michigan asked admission in 1833 with the original boundaries (1805) of the territory. But the settlement of the northern boundary of Ohio and Michigan's admission were inseparable questions, and statehood was denied. When the second attempt to gain statehood failed, Michigan decided to form a constitution and State government without permission. This was done in 1835 along the lines of the Ordinance of 1787 and Michigan actually exercised for about two years, until admitted, all the prerogatives of a State.** During that time the dispute with Ohio waxed warm, both sides being thoroughly determined to gain their point. Michigan exercised jurisdiction over the disputed tract, while Ohio pressed its claims. Troops were sent to the scene by both sides and a disastrous border war was narrowly averted.

Justice and precedent appeared to favor Michigan, but expediency lay on the other side. The ownership of the Lake Erie port now affected national politics and finally was settled on the floor of Congress. Three States and a Territory were drawn into the struggle. By the opinion of the attorney general it was the duty of the President to support Michigan at all hazards, but the latter's in-

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* *Hunt's Merchants' Magazine*, Vol. 9, p. 42.
† *Hunt's Merchants' Magazine*, Vol. 17, p. 490.
‡ *Ibid.*
§ *Ibid.*, Fol. 9, p. 46.
‖ *Ibid.*, p. 44.
** T. M. Cooley: Michigan, pp. 219–220.

terests were on the side of Ohio.* A presidential election was at hand and to support Michigan was to lose Ohio to his party. As a great State it might hold the balance of power in the election. Michigan was democratic and would strengthen the President's party. But Indiana and Illinois, both of which had secured their boundaries in violation of the Ordinance of 1787, were interested adversely to its boundary claims.* Here were three States with votes in the Electoral College on one side, and a non-voting Territory on the other. They would probably be alienated if the President decided against them. If Michigan were admitted before election its votes could not equal those of the three opposing States.* Well might John Quincy Adams say: "Never in the course of my life have I known a controversy of which all the right was so clear on one side and all the power so overwhelmingly on the other, never a case where the temptation was so intense to take the strongest side and the duty of taking the weakest was so thankless."†

Political interests finally prevailed and, as a compromise, the Upper Peninsula and Statehood were offered to Michigan if it would accept the present northern boundary of Ohio. A convention for this purpose was called at Ann Arbor in September, 1836. In the meantime considerable sentiment in favor of acceptance had arisen in the more densely settled and commercial southeastern part of Michigan. It was here that industries, agriculture, shipping interests and financial enterprise were feeling the need of a stable state government even if a valuable harbor must be forfeited. It was the same spirit that desired to give Wayne County to Ohio when the latter State was admitted. It is also probable that the proposed plan of distributing the surplus public money had much to do in determining the attitude of the financiers. But, in general, the frontier population was as determined as ever to fight against an infringement of its rights. Practically all the newspapers of the frontier counties earnestly opposed the surrender of Toledo Harbor and the narrow strip of territory involved.‡ To them it was a matter of justice and right. Their counsel dominated the convention and the proposal of Congress was rejected, thus leaving the controversy as far as ever from settlement.§

But the presidential election was drawing nearer and there was an increasing desire to take part in it. There was also a growing sentiment that nothing could be gained by delay. Accordingly an-

* W. Buel: *Mag. Western Hist.*, Vol. III, p. 457.
† Cited by Cooley: Michigan, p. 219.
‡ A. M. Soule: Pub. Mich. Pioneer and Hist. Soc., Vol. 27, p. 370.
§ *Journal* of the Convention, pp. 19-27 *et seq.*

other and wholly illegal convention was called by individuals. Resolutions accepting the terms of Congress were passed. These were forwarded to Congress and accepted by it as representing the decision of Michigan.* Ohio therefore won its harbor after involving the nation in the struggle, and Michigan won statehood and the Upper Peninsula.

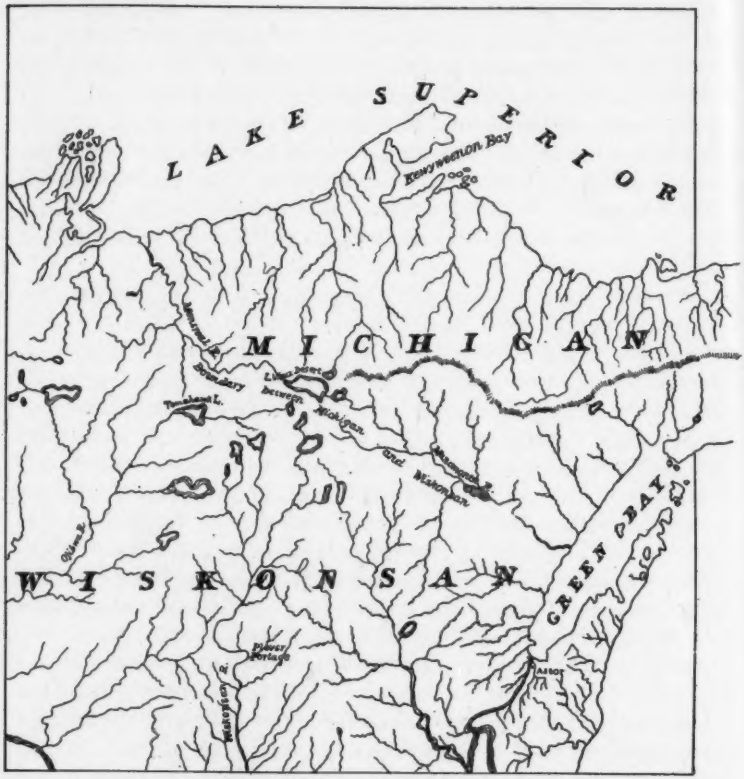

FIG. 4—Supposed boundary between Michigan and Wisconsin, 1838. Sen. Doc. 151, p. 16, 26th Cong., 2nd Sess., Vol. 4.

GEOGRAPHIC CONDITIONS LED NORTHERN MICHIGAN TO SEEK UNION WITH WISCONSIN

The settlement of the northwest boundary played a less important yet an interesting part in Michigan history. The Territory of Michigan, as has been said, was created in 1805, east of a line running

* T. M. Cooley: Michigan, pp. 223–224.

north from the southern bend of Lake Michigan to the Canadian line (Fig. 1). In 1818, all the country east of the Mississippi and north of Illinois and Indiana was added for temporary purposes of government. This was a vast area to be governed from Detroit as a center. The distance and the difficulties of travel were so great that it was practically impossible for the representatives of this region to participate in the legislative councils.* The distance likewise made the exercise of government slow, if not impossible.† The region was being settled rapidly, and soon there was complaint of the great evils resulting from so distant a seat of government.

In 1824, the people west of Lake Michigan petitioned Congress for separate organization. They were joined in their petition by the people north of Mackinac Straits,‡ who felt that their interests were tied up with the western people rather than with the people of Lower Michigan. The Straits formed an impassable barrier between the two peninsulas for a part of every year and seemed to alienate them,§ as it still does to a limited extent. With this petition began the struggle for the Upper Peninsula. The statesmen of Michigan were willing, if not desirous of being rid of the western country on account of its distance and the consequent expense of government, but they objected to the loss of the country north of the Straits and petitioned Congress accordingly. Both petitions were referred by that body and nothing more was heard of it for two years. The desires of these western people for separation from a seat of government so far away grew in intensity as time passed, and, in 1826, "the inhabitants of the northwest part of the Territory of Michigan" again asked Congress to separate them from Michigan proper and allow them self government.** Influences were again brought to bear that caused this to fail.

At the session of the Michigan Legislative Council in 1829 a memorial was presented from the discontented upper counties praying to be annexed to the proposed Territory of Wisconsin. The Council accepted this memorial by a vote of seven to six. Wiser counsel soon prevailed and a few days later it was reconsidered, recommitted and not again reported.†† Constant efforts were directed thereafter against the loss of any of the Upper Peninsula. Yet it is interesting to note that the ties binding the upper counties

* Reports of Committees. No. 56, 21st Congress, 1st Sess., Vol. I. pp. 11–12.
† Wis. Hist. Soc. Coll., Vol. XI, p. 463.
‡ Sen. Jour., 18th Cong., 2nd Sess., p. 68.
§ Wis. Hist. Soc. Coll., Vol. XI, p. 472.
‖ Ibid., Vol. IV., p. 353.
** *Report* of Committees, No. 56, pp. 1–7, 21st Cong., 1st Sess., Vol. I.
†† *Jour.* of Mich. Legislative Council, 1829, p. 81.

to "The Peninsula"* were so weak, and the knowledge of the resources of these counties so slight that even Governor Cass in his message of 1829 said that he was "not aware that" the creation of a new territory "can injuriously affect our interests."† He seems to have changed his mind shortly after, as in his message of two years later he stated that any division of the territory would be "equally injurious to our rights and subversive of our interests."

The people of the upper counties persisted in their efforts for separation, and continued to memorialize Congress. But that body was busy trying to please Ohio and at the same time satisfy Michigan by extending its territory to the northwest in lieu of the Toledo strip. "The Peninsula" was equally energetic in its attempt to secure statehood. The Constitutional Convention of 1835 brought out and emphasized anew the strong feeling in favor of separation still existing among the northern counties. Four members made an earnest effort to insert the proviso in the constitution; "That nothing therein contained shall prevent the Legislature . . . . from consenting to any such alteration of the western boundary line of said State by which the islands of Michilimackinac and Bois Blanc and the County of Chippewa may be detached from the State and attached to the district of country lying west of Lake Michigan. . . ."‡

Michigan's leaders gave little attention to the desires of the people at the north. They began to realize that Ohio was going to win, and Lucius Lyon wrote that it had been decided to "go in for all the country Congress will give us west of the lakes,"§ for, "if we lose on the south, and gain nothing on the north and west we shall be poor indeed."‖ He knew that the fisheries were excellent, believed the soil fertile, and had great hopes that the copper deposits would prove valuable. We have already seen that his advice and plans were ultimately accepted, but not before the people of the State had made great protest against forcing upon them "barren wastes" in a region of "perpetual snow."

Supposed Waterway Proposed as the Wisconsin-Michigan Boundary

A continuous waterway was supposed to exist between Green Bay and Lake Superior (Fig. 4), and Representative Preston pro-

* Name applied to Lower Michigan at the time.

† *Jour.* of Mich. Legislative Council. 1829, p. 5.

‡ *Journal* of Constitutional Convention of 1835, pp. 204–205; for names of members pp. 2, 22.

§ Letter of Lucius Lyon to Col. D. Goodwin, Feb. 4, 1836, Pub. Mich. Pioneer and Hist. Soc., Vol. 27, p. 475.

‖ Letter of Lyon to Col. Andrew Mack, Feb. 21, 1836, Pub. Mich. Pioneer and Hist. Soc., Vol. 27, p. 479.

posed to Congress that this be taken as the boundary. The proposal was accepted and surveyors sent to mark the line. They were, of course, unable to do this, and reported the same to Congress.

In the meantime, since the proposed line was impossible, the Wisconsin people seized the opportunity to again enter their protest

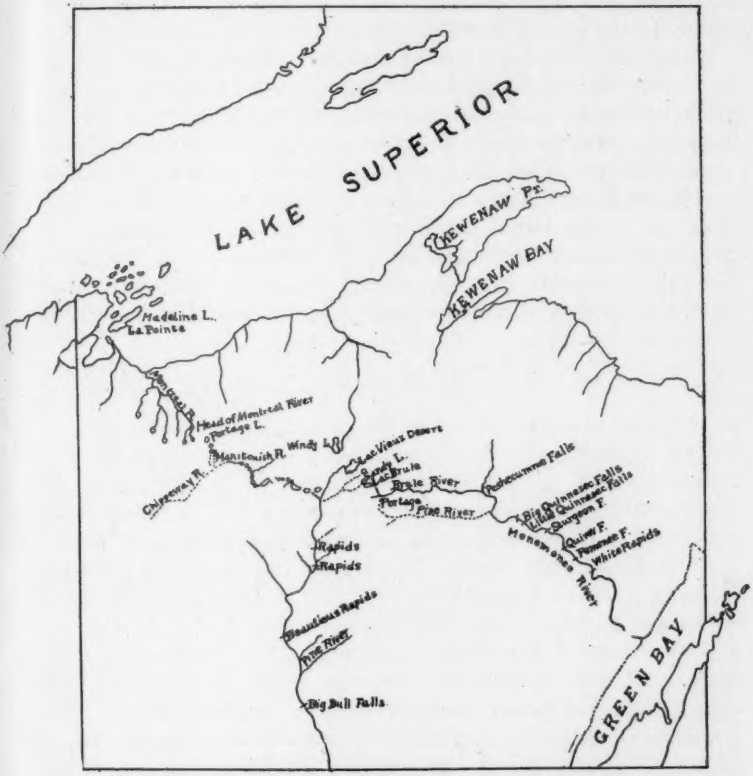

FIG. 5—Boundary between Michigan and Wisconsin, as corrected by Capt. T. J. Cram, 1842. From Sen. Doc. 170, p. 12, 27th Cong., 2nd Sess., Vol. 3.

against the loss of the northern counties.* The petition was buried in committee; and thereby aroused all the strong feelings of state rights within the westerners. State sovereignty was discussed in all its phases and serious trouble seemed imminent.† They did not expect that Michigan would yield territory already given it, even

* *Exc. Doc.* 147, pp. 1–7, 27th Cong., 2nd Sess., Vol. III.
† *Wis. Hist. Soc. Coll.*, Vol. II, p. 462.

though the people of the northern counties so desired, but demanded that Congress should pay Wisconsin for the country thus taken from it. This demand met the same fate as the others,* but very likely had much to do with future appropriations favorable to the State. So much space is given here to Wisconsin history in order to emphasize the far reaching effects of Michigan's struggles resulting from her geographic location and economic interests.†

Even today Michigan's northwestern boundary is not satisfactory. The Brule and Menominee Rivers were found by the surveyor to contain many islands, while the "main channels" of the streams were difficult to locate.‡ Congress therefore accepted his advice and divided the islands between the two States, giving those above Quinnesec Falls to Michigan, and those below to Wisconsin§ (Fig. 5). This would seem sufficient, but the main channel at Menominee which is the legal boundary line, lies on the Wisconsin side of the islands which the enabling act gave to that State, thus causing Wisconsin to exercise jurisdiction over islands that are in Michigan.

Upper and Lower Michigan not Geographic Units

The economic interests of the two peninsulas of Michigan are in striking contrast. The dominant industry of the north is iron and copper mining. Lumbering stands second, while agriculture and manufacturing (other than copper smelting) are of relatively small importance. The two peninsulas are separated by the Lake Michigan-Huron waterway, which is blocked by ice for part of the year. Much of their intercourse therefore takes the route through Wisconsin and Chicago. This leads to more economical trade relations with Wisconsin by the people of the north. The great bulk of their lumber and mine products finds markets outside of Michigan, thus offering little inducement for trade between the two sections. The Southern Peninsula is dominantly agricultural and manufacturing. Its lumbering and mineral resources are also of another sort, being soft woods (largely), coal, and salt. The principal outside markets for its products are found to the west, south, and east rather than in the Upper Peninsula. This means that the two sections are not a geographic and economic unit, and it leads to the differentiation of the interests of the people.

The old feeling of attachment in the Upper Peninsula to the

* A. H. Sanford: State Sovereignty in Wisconsin, in *Pub. Am. Hist. Assoc.*, 1891, p. 177 et seq.
† *House Journal*, 28th Cong., 1st Sess., pp. 483, 740.
‡ Sen. Doc. 151, pp. 7–9, 26th Cong., 2nd Sess., Vol. IV.
§ Statutes at Large, Vol. IX, p. 57.

country at the west, and the lack of strong ties binding it to the Lower Peninsula are still apparent. The separation produced by the lakes has been intensified by the building of interstate railroads. They furnish good communication with Wisconsin and other western States. Here no barrier exists, and the economic and social interests on both sides of the line are identical. The effort to court the favor of the Upper Peninsula has always been a factor in Michigan politics. It was the long established custom of the political parties to give it the office of Lieutenant Governor and the certainty of losing this in case "Primary Reform" was adopted led to much discussion if not to serious opposition to it in that section. As was foreseen its adoption took this office from the Upper Peninsula. A substitute had to be secured in order to avoid serious disaffection, and that substitute was found in the office of Superintendent of Public Instruction. This illustrates the human response to geographic and economic environment. The activities of a government may be extended over an area within boundary lines arbitrarily drawn, but the establishment of those lines does not make a united people. Few States of the Union are economic units hence their government is a compromise of diverse interests.

THE HEMPSTEAD PLAINS

A NATURAL PRAIRIE ON LONG ISLAND

BY

ROLAND M. HARPER

It does not seem to be generally known, even to geographers, that there is in the western third of Long Island, within an hour's journey by rail from New York, about fifty square miles of dry land which was treeless when the country was first settled, and that a considerable part of this can still be seen in its natural condition. This prairie, known locally as the "Hempstead Plains," is mentioned in a few historical and descriptive works, but long before geography became a science it had ceased to excite the wonder of the inhabitants and travelers, few of whom at the present time realize that there is not another place exactly like it in the world. Its influence on local geographical nomenclature is shown in the names Plainview, Plain Edge, Island Trees and East Meadow Brook.

The earliest description of this geographical curiosity which I have heard of occurs on page 241 of "A Tour in the United States of America," by J. F. D. Smyth, Esq., published in Dublin in 1784. There are several interesting references to it in the two editions of B. F. Thompson's History of Long Island, published in 1839 and 1843, especially the second. My attention was first called to it by the following statement in the U. S. Department of Agriculture's "Soil survey of the Long Island area," by J. A. Bonsteel and others:—* "The . . . . Hempstead plain is notable in being a natural prairie east of the Allegheny Mountains. In its natural state it bears a rank growth of sedge grass. It was treeless when first discovered and was originally used as commons for the pasturage of cattle and horses belonging to individuals and to communities."

FIG. 1—Looking east across dry valley at Hempstead Brook, east of Garden City, showing treeless horizon about ½ mile away. No traces of cultivation in this view. Sept. 29, 1909.

The same thing has been mentioned incidentally in the catalogues of Isaac Hicks & Son, nurserymen of Westbury, L. I., and in "Long Island Illustrated," an attractive booklet issued annually by the Long Island Railroad.* In "Forest and Stream" for Aug. 15, 1908, I published a preliminary note on the subject, illustrated by a photograph.

For a generation or more the Hempstead Plains have been known to a few botanists as a good collecting ground, and every one who has traveled from New York to Cold Spring Harbor by rail, since

*Field operations of the Bureau of Soils for 1903, p. 99; or p. 13 of the "advance sheets" for this particular area, published in January, 1905. A somewhat similar statement occurs 27 pages farther on. I am also indebted to Dr. Bonsteel for the reference to Smyth mentioned above.

†On page 19 of the 1907 edition it is stated that "Through the centre [of the island] will be found stretches of meadow blending into prairies of the western type"; but this statement does not appear to be in some editions a few years earlier.

the establishment of the Brooklyn Institute's biological laboratories there, has passed through several miles of what was once prairie, and seen a little which is still in its natural condition; but to this day the real nature of the area in question has apparently never been mentioned in botanical literature. Previous to the summer of 1907 I had been along the edges of the area, as defined by Bonsteel, in several places, and penetrated into it for short distances, without seeing any natural vegetation, so I supposed that the prairie was all occupied by villages, private estates, farms, etc., and that it was consequently no longer possible to verify the published statements about its original vegetation. But one day in July of that year I happened to cross the center of the area on foot, and was surprised to find that there are still thousands of acres on which the flora is practically all native. This is pretty good evidence that such areas

FIG. 2—Looking W. N. W. in dry valley near southeastern corner of Hempstead Plains, showing a few small oaks and birches along the horizon. Sept. 19, 1909.

have not only never been artificially deforested, but also never been touched by the plow. Where the sod is once broken a very different flora, consisting largely of European weeds, comes in, so that areas which have ever been cultivated can be distinguished at a glance. The same is true to some extent of areas that have been too closely grazed.

The prairie occupies the central portion of Nassau County, about midway between the north and south shores of the island. Like the pine-barrens of Suffolk County, a few miles farther east,* it lies entirely south of the latest terminal moraine (the Harbor Hill moraine), but partly overlaps or dovetails into the older of the two Long Island moraines (the Ronkonkoma moraine). Originally it extended westward to where Floral Park now is and eastward to

*Torreya. Vol. 8, p. 2. 1908.

Central Park, a distance of about twelve miles, and had its greatest breadth from north to south of about seven miles very near its eastern end. North of the straight main line of railroad from Floral Park to Hicksville, and also west of Garden City and Hempstead, the original prairie vegetation has been almost totally obliterated; but a little south of Hicksville there are still a few places where one could describe a circle a mile in diameter without including a tree or a house or a field. Probably about one-fifth of the original prairie area is still in its natural condition, except for being intersected by roads.

The surface of the Hempstead Plains, like the rest of the southern or unglaciated portion of Long Island, is for the most part very flat, and slopes gently southward at the rate of about one foot in 300. It ranges in altitude from about 60 to 200 feet above sea-level. Traversing the plain in a general north and south direction are a number of nearly straight broad shallow valleys, ten to twenty feet in depth, which are believed by geologists to have been formed by glacial streams and not by recent erosion.* Within the limits of the prairie most of these valleys are now dry at all seasons, but farther south some of them contain permanent streams.

The soils of the area under consideration were described and mapped by Dr. Bonsteel's party, in the report already cited, as "Hempstead loam" and "Hempstead gravelly loam."† The former, which covers much the greater area, is a fine-grained loam, of a color which might be described as chocolate-drab, full of tough roots of grasses and other herbs near the surface, and passing rather abruptly at a depth of a foot or two into a coarse quartz sand and gravel of unknown depth. The "gravelly loam" phase is where the gravel comes to the surface, and it is chiefly confined to the slopes of the valleys above described.

Mechanical analyses of these soils are given in the government publications cited. Dr. E. W. Hilgard has kindly examined for me a sample of the "Hempstead loam" collected about a mile southeast of Hicksville in 1908, and finds it to consist almost entirely of clean quartz grains, with 1 per cent. of humus, .03 per cent. of lime (this in acid combination with the humus), and .04 per cent. of phosphoric acid ($P^2 O^5$).

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* A. C. Veatch, *Prof. Paper* U. S. Geol. Surv. No. 44, pp. 47, 52. 1906.

† In another publication of the Bureau of Soils, issued about the same time ("Instructions to field parties, and descriptions of soil types. Field season, 1904." Page 61) it is stated that the gravelly loam should have been mapped as Hempstead loam with gravel symbol; and the same statement is repeated in subsequent editions of this handbook.

Outlying areas in Kings and Suffolk Counties, mapped as "Hempstead loam" in the same report are now almost entirely under cultivation, and I know of no evidence that they were ever prairie.

The upland vegetation of the Plains comprises about four species of trees, a dozen shrubs, sixty herbs, and a few mosses, lichens and fungi. The commonest tree is gray birch (*Betula populifolia*), which in this region is oftener a shrub than a tree, and the other trees are two oaks (*Quercus Marylandica* and *Q. stellata*) and a pine (*Pinus rigida*), which are scattered sparsely over the eastern part of the area. The shrubs also are most abundant eastward. One of them is a willow (*Salix tristis*) and two are oaks (*Quercus ilicifolia* and *Q. prinoides*), and nearly all grow less than knee-high. The commonest herb is broom-sedge (*Andropogon scoparius*), a species of grass, which is said to be also common on some of the western prairies. The herbaceous vegetation, which is almost the only vegetation between Hicksville and Hempstead, with the exception of a ubiquitous shrub of the heath family (*Pieris Mariana*), covers the ground pretty closely except in the most gravelly areas, is nearly all perennial, and averages about a foot in height.

Although the prairie vegetation grows in comparatively dry and sour soil, and gets about all the sunshine and wind there is in those parts, it exhibits no extreme xerophytic adaptions. A good many species, including several of the most abundant ones, have decidedly canescent foliage, and about half as many are glaucous, so that the whole landscape has rather a grayish tint. A large proportion of the species have very narrow leaves, but there are no succulents, and very few evergreens. On the other hand there are of course no very large or thin leaves.

Most of the trees and shrubs bloom in spring and most of the herbs in late summer. Most of the woody plants and about one-sixth of the species of herbs are wind-pollinated. Most of the colored flowers are either white, yellow or purplish, and none of them are very large or noticeably odoriferous. Wind is naturally the chief agent of dissemination, but the scarcity of berries and the complete absence of burs, in a region so accessible to birds and mammals, is a little surprising.

The dry prairies just described cover something like 99 per cent. of the area. The principal stream in the Plains is East Meadow Brook, which begins gradually, at an indefinite point varying with the wetness of the season, in one of the valleys about three miles east of Mineola and Garden City, flows nearly due south, and enters the woods about a mile from its source. Next in importance is Hempstead Brook, which flows right through the town of Hempstead. It takes its rise in a narrow strip of meadow just above the town, and its dry valley can be traced for a few miles to the north-

ward. Still farther west there are one or two smaller streams similarly situated and bordered originally by similar vegetation, but now considerably encroached upon by civilization. The wet meadow vegetation along these streams when viewed at a little distance does not differ much in aspect from that of the dry prairies, except that it is taller, many of the shrubs being as high as a man's head and the herbs knee-high. The species in the two habitats are of course almost entirely different, but their numbers happen to be about equal.

This prairie was originally bordered all around by forests, mostly of the oak type, but the border-line has been nearly everywhere obliterated by civilization, as it was a very attractive place for farms when the country was first settled, the woods on one side furnishing fuel, building material, good soil, protection from wind,

FIG. 3—Looking up the valley of East Meadow Brook from a point about 2¾ miles east of Garden City. Hills of the Harbor Hill moraine in the distance. Except for a few scattered shade-trees, half a mile or more from the camera, this scene probably looks just as it did a thousand years ago. October 27, 1907.

etc., and the prairie on the other furnishing a good range for stock and an open place for buildings, etc., without the labor of clearing. At some places south of Hicksville only a single row of fields at present intervenes between the "Hempstead loam" prairie and the "Sassafras gravelly loam" oak forest, but in most places the original boundary of the prairie could now hardly be determined within half a mile. Before the country was settled the oaks were presumably encroaching on the prairie from all sides. But in the few places where pine forests border the prairie I have never been able to determine which way the tension-line is tending to move.

The cause of the treelessness of prairies has probably been discussed in geological, semi-popular, and non-botanical literature more than any other strictly botanical problem, and perhaps even

more than it has by botanists but no explanation has yet been found to fit all cases. Some of the partial explanations which have been suggested for the well-known prairies of the upper Mississippi valley will apply as well to the one under consideration, and some will not.* In a paper of such limited scope as this it would be out of place to attempt to review all the prairie theories, or even to mention all who have speculated on the subject; and only the briefest summary can be given here.

Among the western prairie theories which will not apply on Long Island are deficient rainfall, extreme variations of temperature, and impervious subsoil. The only previous attempt to explain the Long Island prairies (at least in print), that of Dr. Bonsteel, does not fit much better. In his soil survey report above mentioned he seems

FIG. 4—Looking up slough at western edge of valley of East Meadow Brook, 2¾ miles east of Garden City. Gravelly hillside at left. Sept. 29, 1909.

to imply that the absence of trees is due to the coarse dry gravel which underlies the whole area; a condition which is just the opposite of that found in some of the Illinois prairies. But within a few miles of our prairie there are soils still more gravelly and arid which are well wooded.

Our prairie is subject to a good deal of grazing, frequent fires, strong wind, and excessive evaporation, like the western ones, but these factors are the result rather than the cause of treelessness, so that they could hardly have determined the prairie in the beginning or fixed its present boundaries.

* The interesting papers of Shimek (*Proc.* Ia. Acad. Sci. Vol. 7, pp. 47–59, pl. 4. 1900) and Gleason (*Bull.* Torr. Bot. Club. Vol. 36, pp. 265–271. 1909) should be examined in this connection.

There are two suggestions that have been made with regard to the prairies of the Middle West which deserve more notice, though each leaves much to be explained. Alexander Winchell in 1864* summed up the opinions of most of his predecessors on the subject, indulged in some curious and perhaps not altogether essential observations on the vitality of buried seeds, and concluded that the "prairies were treeless because the grasses first gained foothold and then maintained it." The same idea has recently been expressed more elaborately by L. H. Harvey.† Prof. J. D. Whitney in 1876‡ distinguished between the arid plains toward the Rocky Mountains and the relatively humid prairies near the Mississippi River, showed the inadequacy of climatic theories to account for the latter, and pointed out that all such areas known to him were characterized by essentially horizontal strata, level surfaces, and finely divided soil. He distinguished between cause and effect, unlike some others who have written on the subject, but admitted his inability to show a causal relation between the conditions he described and the absence of trees. What he said about the topography and soil of the western prairies applies almost as well to those of Long Island§ (which he probably knew nothing about), and even to some other kinds of treeless areas, such as wet meadows and salt marshes.

Although the prairies of Long Island are closely correlated with a certain type of soil, it is still an open question whether most of the peculiarities of prairie soil, here and elsewhere, may not be due to long occupation of the same ground by herbaceous vegetation. In its mechanical analysis, and even in its color, the "Hempstead loam" strikingly resembles the "Galveston clay" (an arbitrary name for a well-known type of soil, the salt marsh) described in the same government soil report; but it is probably a little too early to jump to the conclusion that the area in question was once a salt marsh while adjoining areas were not.

Not the least interesting fact about this unique insular coastal plain prairie is that so much of it is still in a state of nature, although it is situated in a county which has been settled for 250 years and has about 300 inhabitants to the square mile, and is all within the zone in which it is profitable to haul farm products to New York by wagon. This state of affairs is probably due to a combination of several more or less independent causes. Good

* *Am. Jour. Sci.* Vol. 88, pp. 332–344, 444–445.

† *Bot. Gaz.* Vol. 46, pp. 86, 297. 1908.

‡ *Am. Nat.* Vol. 10, pp. 577–588, 656–667.

§ Mechanical analyses of the "Hempstead loam" by the U. S. soil people show that about 76 per cent. of it consists of particles less than 1/20 of a millimeter in diameter, and that less than 3 per cent. of it is in particles exceeding a millimeter.

crops are raised on the parts that are under cultivation—with what margin of profit I have not ascertained—but the toughness of the sod, the thinness of the soil, and especially the scarcity of water, doubtless operate strongly to keep away new settlers unused to such conditions. The prairie farms have probably been handed down from father to son for generations, and the newcomers in the county (most of whom now come from the city or from Europe) are mostly settling in the villages, where they are independent of many of the local geographical conditions. That tradition has had a good deal to do with the preservation of the prairie is suggested by the following passage in the second edition of Thompson's History of

FIG. 5—Edge of small grove of pitch pine (*Pinus rigida*) in prairies about a mile southwest of Central Park. Aug. 25, 1909.

Long Island (Vol. I, p. 29, 1843), which would be almost equally true today:

> "If the whole of this open waste was disposed of and inclosed in separate fields, the agricultural products of this portion of the island would be nearly doubled. A stupid policy, consequent upon old prejudices, has hitherto prevented any other disposition of it, than as a common pasturage. It is hoped the time is not far distant, when this extensive tract shall abound in waving fields of grain, yielding not only support, but profit, to thousands of hardy and industrious citizens."

It is said that A. T. Stewart, the merchant prince, when he founded Garden City and built a new railroad across the Plains,

about forty years ago, bought out the town's remaining interests in this land for $55 an acre, and that a large part of it is still held by his heirs and leased to wealthy people living in the vicinity, who find it a splendid place for various equestrian sports in which they have long been accustomed to indulge. For several years past automobile races have been held on the better roads of this exceptionally level area, and the year 1908 saw the beginning of the "Long Island motor parkway" in this area, an undertaking which was no doubt facilitated by the scarcity of trees and farms. Still more recently the Hempstead Plains, for the same reason, have attracted considerable attention as the scene of a number of experiments in aeroplane flight.

Even if no more of this land were taken up in farms, the continued growth of New York City is bound to cover it all with houses sooner or later, and it behooves scientists to make an exhaustive study of the region before the opportunity is gone forever. Zoologists as well as botanists would find much to interest them here. According to Dr. W. C. Braislin* the Hempstead Plain was once the home of the heath-hen, which is now making its last stand on Martha's Vineyard. At the present time several other birds which are infrequent elsewhere, especially certain sparrows and larks, find a congenial habitat on the prairie, and insects, especially grasshoppers, are quite abundant at the proper seasons.

No one seems to have yet attempted seriously to enumerate, classify and explain the numerous and various treeless areas of Eastern North America. If this were done perhaps other areas similar in character to the one described might be found. There are abundant hints of small prairies, open glades, natural meadows, etc., in early descriptive works dealing with parts of the country that are now pretty thickly settled, and many examples of them have doubtless already been effectually obliterated, and irrevocably lost to science.

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* *Abstr. Proc.* Linn. Soc. N. Y. Vol. 17-19 (1904-1907), p. 66.

RATIONAL STUDY OF TOPOGRAPHIC FORMS*

A REVIEW

BY

PROFESSOR W. M. DAVIS

The author of this large and imposing work understands by "Topologie" the rational study of topographic forms on a more detailed scale than is usually reached in works on physical geography. His monograph is in a sense a sequel to La Noë and Margerie's "Les Formes du Terrain" (Paris, 1888); but the more immediate impulse towards its preparation appears to have come from the new maps of parts of France, which have been produced by the Geographical Service of the Army in the last twenty years on a larger scale and with more faithful execution than the older maps. The work also accomplishes the author's wish of placing before the officers of the French army, for whom it is primarily intended, numerous extracts from recent geological treatises, which are regarded as indispensable in topological studies.

The chief divisions of the volumes are as follows:—Geology (pages 1 to 124), including something of structure, deformation and erosion, with a brief sketch of the structure of France, Algeria and Tunisia; mountains of moderate relief (125-243), such as the Vosges, the Jura, and the Saharan Atlas; high mountains (244-326), illustrated by examples from the French Alps, with glaciers, torrents, crests and summits, slopes and valleys for sub-headings; valleys in regions of moderate relief (331-432), treating longitudinal and transverse profiles, meanders, captures, and so on; plains and plateaus (433-525), in which parts of the Colorado canyon, reduced to 1:50,000 from the admirable 1:48,000 map of the U. S. Geological Survey, supplement the French examples; coastal features (526-568), treating sand and gravel beaches, cliffs, estuaries and deltas, with examples of fiords from Norway; and finally volcanic forms (569-643), with examples from Italy and Japan, as well as from central France.

There is an immense deal of valuable material in these massive volumes. No geographer can fail to profit from them. In view of the definition of "Topologie" as "l'étude raisonnée des formes topographiques" and in view of the abundant full page plates of fine topographic maps on large scales, the most pertinent passages in the text are those immediately concerned with existing land forms. In the account of the Vosges, for example, one finds a minute description (p. 134) of the domed crests, smooth slopes, narrow valleys and rounded valley-heads, all treated as the result of normal erosion in massive crystalline rocks. Again, in the account of the Atlas mountains (197), numerous striking examples of the relation of form to structure are described, involving all kinds of combinations of anticlinal, synclinal and monoclinal ridges, in various stages of continuity and of relief; and so on, through various chapters. Moreover the numerous plates are of exceptional value. Many of them are taken from the new map of France on the scale of 1:20,000, with 5-meter contours, as yet incomplete and generally inaccessible; thus providing remarkably fine illustrations of faithfully executed, detailed mapping. Others are on a scale of 1:200,000, giving only contours in black and rivers in blue, and thus bringing out general topographic features with great nicety; a number of sub-

*Topologie. Étude du Terrain. Par le Général Berthaut. 2 Vols. in 4to: i-ix, 1-330; 331-674 pages; 265 planches. Imprimérie du Service géographique de l'armée. Paris, 1909 and 1910.

mature valleys carved by meandering rivers are beautifully shown in this way. The maps of the Saharan Atlas are on a scale of 1:100,000, with unusually significant expression; they offer exceptionally fine examples of the control exercised by structure in guiding erosion and determining form.

Evidently the patient student of land forms must gain a vast amount of pertinent knowledge, as well as a valuable experience, in examining the elaborate text and the lavish illustrations of this great monograph. Yet we wish that he did not have occasion to meet so many rather accidental mixtures of explanatory and empirical treatment; for in this respect these superb volumes hardly represent the modern standard of geographical presentation. In the rational study of land forms, such as is here avowedly undertaken, explanation ought always to be consciously and systematically introduced as a means of description, insofar as it is safe and helpful; only where it cannot be thus applied should resort be had, intentionally and avowedly, to empirical treatment. It is therefore a disappointment to find an empirical treatment employed in describing districts which might safely be presented in explanatory fashion even by a relatively conservative geographer; for example, the northeastern outlier of the central plateau of France, known as the Morvan (p. 137), where the combination of two cycles of erosion is so manifest in the highlands and in the valleys which dissect them; and this disappointment is all the greater because an explicit account of the cycle of erosion is given in the introductory pages (95—), as if in preparation for its use later on. Again, the adoption of a rational treatment carries with it the introduction of a technical terminology, by means of which the forms that are at first elaborately explained can afterwards be easily recalled by the use of a brief name; yet when the valleys of the Vosges are treated in detail, as above indicated, they are described in paraphrased style, and very few technical and genetic terms are used. The absence of such terms is all the more curious, because the preliminary explanations in the earlier pages introduce such terms as young, mature, old, rejuvenated, and so on. But in spite of this, the scheme of the cycle and the genetic terminology that naturally goes with it remain for the most part as introductory abstractions, not applied in the body of the text.

As a result, while the descriptions even in their incompletely explanatory form will surely give much information to the serious student, they will not aid him greatly in phrasing concise descriptions of his own, because they are too often unsystematic and over-elaborate. This is much to be regretted, particularly in a work addressed to army officers; for it is precisely such officers who need not only the aid of rational understanding in the observations of land forms, but also the aid of systematized explanatory terminology in talking and writing about them. Indeed until an observer, be he of military or other profession, can give a clear and intelligible description of the landscape that is before him, he as well as his associates must remain in considerable doubt as to the sufficiency of his training. This point is not, in the opinion of the present reviewer, strongly enough emphasized in various books on military geography, in which as a rule no sufficient attention is given to the systematic and concise description of the visible landscape. As a matter of fact, the experience of various students of land forms has demonstrated that the most powerful means of conveying the meaning of an observer to the understanding of a hearer is found in some kind of explanatory method, with its appropriate terminology; and it is precisely in monographs as comprehensive as the one before us that a systematic and consistent explanatory terminology should be developed.

It cannot be too carefully borne in mind that, if land forms are to be treated rationally, and if their explanation is to serve as an effective means of description, the explanation must not be so cumbersome that the hearer's attention is carried to the past processes that have been concerned in producing the existing forms, instead of being held closely to the forms themselves. A directness of style should therefore be cultivated in explanatory physiographic texts, and irrelevant matter should be omitted, however important or interesting it may be in other connections. A single-minded attention to the meaning of the immediately visible landscape is essential in the rational study of land forms: hence the pages allotted to the nebular hypothesis of Kant, the pentagonal network of Elie de Beaumont, the tetrahedral theory of Green, and the "formule de l'océan pacifique" might well have been devoted to other topics in a treatise on French topography for French officers, however valuable these speculations are in theoretical geology. To be sure, all serious studies of past processes have their own value, along with other geological studies, as examples of explanatory speculations, more or less successful and convincing, concerning what has happened in earlier stages of the earth's history; but in handling geographical problems, the studies of past processes must be neither indirect nor inconclusive nor cumbersome, if they are to replace empirical treatment in the description of existing and visible land forms.

With this principle in mind, let the reader examine the account of the Côte d'Or between the Seine headwaters and Sâone (p. 149—), and estimate the practical value of the explanatory treatment that is there attempted. This is a district in which faults are important structural features, yet in the special discussion of the influence of faults on the topography (159—) one finds no sufficient statement of matters so important as the measure of displacement, of the relative resistance of the displaced masses, or of the amount of erosion that has taken place since faulting. The treatment here ought to be fully modernized; yet it is only transitional between a frank empiricism which is satisfied with surface form because it knows nothing of structure, and a thorough-going explanation, which is unsatisfied until the influence of structure in guiding erosion to produce form is specifically and clearly and helpfully set forth. No effective use can be made of faults as an element of explanatory description in a district of so complicated structure as the Côte d'Or, until the examples of faults there found are introduced by a systematic series of deductively developed fault-forms in various stages of erosion, so that the reader can perceive the relation of the local examples to a general scheme. Only when the reader advances from a general scheme of this kind, equipped with a good assortment of type forms, each of which may be handily brought to mind by an appropriate name, can he effectively use the explanatory method in the treatment of faulted structures in various stages of erosional development. This systematic procedure is essential in order to reach practical results. Otherwise, a special explanation, unrelated to general considerations, has to be invented for every example of faulted structure; and such a procedure is so tedious that the most determined rationalist must abandon it and return to the blind simplicity of old-fashioned empirical methods.

The discussion of river meanders (397—), one of the most pleasing problems encountered in the explanatory treatment of land forms, is beautifully illustrated by a choice series of incised meandering valleys in various stages of erosion, and a matter so generally neglected as the down-valley migration of meanders is explicitly set forth; yet the treatment of this chapter is complicated

and inconclusive, and like the treatment of most of the other chapters, it furnishes no adequate terminology for practical use in the explanatory description of actual landscapes. The treatment of this particular subject is indeed in some respects out of date, for it sets out with the theory, advocated by Belgrand some years ago, that open-floored, mature valleys are the work of ancient rivers as wide as the valley floors during a former, more rainy climate (81,556), and concludes that meanders themselves are primarily due to a climatic change from heavier to lighter rainfall: "la principale cause première des méandres, qui existent partout, paraît être le passage d'un régime de pluies intenses, d'érosions et d'alluvionnements considérables, à un régime plus sec, comportant des cours d'eau réduits de volume" (429: see also 403, 409).

Another problem of importance in which the treatment is of insufficient generality is that of coastal forms. If there is any chapter of physiography in which the plan of describing actual forms in terms of the systematic series of forms evolved by the action of external forces upon structural masses, it is the chapter which deals with shore lines; yet coastal forms are treated in a somewhat disjointed and incomplete manner, from which the reader cannot easily perceive the normal, uninterrupted succession of their development. Many excellent examples are described and figured, but the chapter closes without reaching a sufficient breadth of treatment.

A curious insularity of method—if such a phrase may be used regarding a work produced in a continental country—is revealed in the citation of French authors only, with the occasional addition of foreign authors whose articles have appeared in French translation: the only exception being Salisbury and Atwood's "Interpretation of Topographic Maps." An insularity of this kind may perhaps work to the advantage of the foreigner who consults this great treatise by giving him a close view of French physiographic essays, as well as of French physiographic features; but it certainly works to the disadvantage of French readers, to whom the treatise is primarily addressed. Beautiful and varied as France is, extraordinary as are the features of its African possessions, rich as French geographical literature has come to be, the study of the forms of the land cannot be advantageously limited to sources in one language. Particularly unfortunate is such a limitation in a work addressed to the officers of the French army, whose appreciation of their home geography surely cannot be best developed by so exclusive an attention to home reading. Perhaps this limitation might have been avoided if there had been associated with the author, as there was with General de la Noë twenty years before, a younger civilian, who should have had at once a cosmopolitan acquaintance with geographical literature and a thorough training in scientific exposition.

We must heartily congratulate the distinguished author of "Topologie" on completing so formidable a work as is represented in these two volumes. It is a pleasure to figure to oneself the enthusiasm with which the work was carried on; and surely a great enthusiasm was needed as a support for the perseverance demanded in gathering the materials and writing the text of so large a treatise. One must furthermore rejoice that a rich budget provided the funds for publication in handsome form and for a most generous distribution to geographical libraries, where it shall be available for consultation by many readers. We bespeak for these valuable volumes, now in the Library of the American Geographical Society, a careful examination by students of the forms of the lands.

GEOGRAPHICAL RECORD

THE AMERICAN GEOGRAPHICAL SOCIETY

THE APRIL MEETING OF THE SOCIETY. A regular meeting of the Society was held at the Engineering Societies' Building, No. 29 West Thirty-ninth Street, on Tuesday Evening, April 25, 1911. Vice-President Greenough in the Chair.

The following persons recommended by the Council were elected to Fellowship:

Mrs. Arabella D. Huntington,	Walter Jennings,
Norman James,	William C. Wood.

The Chairman then introduced the Hon. John Green Brady, who gave a lecture on "Alaska." Gov. Brady was for twelve years Governor of the Territory. He treated Alaska in its geographical relations, varieties of climate, mining, fisheries, forests, agriculture and possibilities of large development. Many lantern views were shown, including maps.

AMERICA.

ANNALS OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS. The Association has voted to establish a publication with the above title. The publication Committee is composed of Prof. Richard E. Dodge, Chairman and Editor; Mr. Alfred H. Brooks, Prof. Henry C. Cowles and Prof. Ralph S. Tarr. The *Annals*, for the present, will be an annual volume of about 200 pages containing selected papers read before the Association. The Committee is now receiving the manuscripts of papers read at the Pittsburg meeting.

The next meeting of the Association will be held in Washington during the holidays next winter, in connection with the meeting of the American Association for the Advancement of Science.

THE STATE GEOLOGICAL SURVEYS. The U. S. Geological Survey has just issued *Bull.* 465, "The State Geological Surveys of the United States." This is a most desirable work, for it has been difficult or impossible to obtain information about these surveys. A committee consisting of H. B. Kümmel, New Jersey, C. W. Hayes, U. S. Geol. Surv., F. W. De Wolf, Illinois, and W. McCulloh, New York, was appointed at Washington in the spring of 1910 to take charge of the matter. The committee decided that the end in view could best be attained by requesting the heads of the several surveys to prepare statements regarding the organizations. Mr. Hayes has compiled the *Bulletin* from these statements. Thirty-six states recognize geological work as a necessary and proper governmental function, and have organizations for the carrying on of such work. Idaho, Montana, New Mexico and Utah have had no state surveys.

CANAL ZONE TRIANGULATION SYSTEM. The primary triangulation of the Canal Zone has been completed by the Chief Engineer's Office. The *Canal Record* (April 5, 1911) prints a sketch of the triangulation showing the stations and the network of triangles. The new triangulation system has been made the standard for all survey and location work in the Canal Zone and has been designated as the "Panama-Colon Datum."

GLACIER NATIONAL PARK. The U. S. Geological Survey is now engraving a topographic map of the new Glacier National Park. This splendid playground, the youngest of our national parks, covers nearly a million acres in northwestern Montana just south of the Canadian line and includes the Lewis and Livingston mountain ranges, which constitute the northern Continental Divide. Throughout the area hundreds of peaks rise 8,000, 9,000 or 10,000 feet above sea level, alternating with sheer-walled canyons 1,000, 2,000 and even 3,000 feet in depth, at the bottom of which dash glacial torrents. More than 60 glaciers may be found in the park, some of them several miles in area. The map shows also many lakes, large and small, nestling in the old glacier-scoured basins. The park is described by the Federal topographers as a place of wondrous beauty, one of the most magnificent mountain regions in the world.

GOVERNMENT PHOSPHATE LANDS. About two years ago our Government withdrew from public sale large areas of land underlain by phosphate rock in the recently discovered fields in the public land States, with a view to securing legislation which would prevent exportation of the phosphate. Since then new deposits of phosphate have been discovered by the U. S. Geological Survey. The area now standing withdrawn is over 2,500,000 acres, containing an aggregate of many hundred million tons of phosphate rock and having a very great potential value to the farming industry. The acreage and location of the Government's phosphate areas standing withdrawn from public entry on April 1 are: Montana, 33,950 acres; Florida, 37,439; Idaho, 1,101,517; Utah, 107,745; Wyoming, 1,267,494. Total, 2,548,145.

GEOGRAPHY OF WORCESTER, MASS. A paper by Mr. Robert M. Brown of the State Normal School, Worcester, Mass., on "The Geography of Worcester," has just been published (83 pp., 8 figs). It is a systematic study of home geography intended for mature minds; and it cannot fail to be a good guide to teachers who may follow its plan and content to advantage in arranging talks or studies on home geography for the class room. Many of Mr. Brown's suggestions in the chapter "Map-Work" have been emphasized very little or not at all in the minds of most of our teachers of geography. This chapter may be especially commended for wide perusal. The pamphlet gives one of the best treatments of all the geographic relations of an important city that has yet been printed.

SOILS OF THE OZARK REGIONS. Many state and federal soil survey reports contain clear and accurate descriptions of soil characteristics, together with intelligent discussions of the relations of soils to topography and geology. A considerable number of reports show an appreciation of the geographic relations between the inhabitants and the soils of the areas. Professor C. F. Marbut in a recent bulletin on the "Soils of the Ozark Regions" has written a clear readable description of the structure, topography and soils of the Ozarks in Missouri, with an appreciative discussion of the relations of these factors to the people.

The Ozarks in Missouri, occupying an area of 30,000 square miles, is preeminently a region of limestone rocks. The Ozark uplift bowed the rocks into a gentle dome which was peneplained and subsequently uplifted. The surface is sub-maturely dissected, only a few remnants of the early plain remaining. Erosion on such a structure has produced three areas, fairly distinct in topography and soils.

The Ozark border is for the most part a prairie region with soils derived from Mississippian limestones. The Ozark plateau has rather uniform lime-

stone soils, the soil differences being largely due to topographic variants. The Ozark center is in part composed of crystallines which have been uncovered by erosion of the Ozark dome. Its surface is rough, and its soils are derived from flinty limestone, sandstones and crystallines.

The Ozark soils are relatively infertile when compared to the prairie and alluvial soils of Missouri, although they would compare favorably with many Eastern soils that are considered productive. The agricultural methods in vogue are not well adapted to local conditions. The extensive methods of raising wheat and corn which prevail in the prairies are not suitable for the Ozarks. When the methods and crops are properly adapted to the region, Prof. Marbut holds that the Ozark center will support a sparse agricultural population in the valleys by grain growing, while the uplands will be devoted to timber. Stock raising and dairying on the Ozark Plateau and dairying and general farming on the Ozark Border are best suited to these regions.

The permanent settlers of the Ozarks were for the most part from the Southern Appalachians, and except in the larger mining areas, the country is still largely peopled by their descendants. The early comers settled along the narrow flood plains or "bottoms." As population increased, settlement spread to the interstream uplands. Stock raising at first was the principal occupation, but with the exhaustion of the range, grain raising followed, with poor returns. Owing to decreasing returns from the land and subdivision of the original farms, the average farmer's income is less than that of his father. There is widespread discontent and eager search for more remunerative methods.

Professor Marbut's contribution is entitled "Soils of the Ozark Region, *Research Bulletin No. 3* of the Agricultural Experiment Station, University of Missouri." It includes 273 pages, structural sections and a colored map showing the distribution of soil types. F. V. EMERSON.

LOW TEMPERATURES INJURIOUS TO ORANGES. During the cold weather of December 30-31, 1909, in Florida, some interesting observations were made by Civil Engineer Frank Merriwether, of Winter Park, Florida, in order to ascertain at what temperature oranges really freeze. Mr. Merriwether sat up the entire night of December 29-30, to watch his thermometers. Through a small hole in the rind of an orange hanging on a tree, the cylindrical bulb of a thermometer was pushed into the pulp, the rind fitting closely around the glass stem of the instrument. The readings were as follows: 9 P. M., 43°; 10 P. M., 40°; 11 P. M., 37°; 12 P. M., 35°. At midnight a second thermometer, similar to the first, was hung near the orange, in order to get the air temperatures. It appears that the orange must have begun to freeze at 5.30 A. M., when the immersed thermometer showed 26°, while the air temperature was 24°. After that time the mercury in the thermometer whose bulb was inside the orange, rose, as a result of the freezing. (*Monthly Weather Review*, Jan., 1910.)

R. DEC. WARD.

THE HANDBOOK OF AMERICAN INDIAN LANGUAGES. Part 1 of this work, prepared under the editorial supervision of Dr. Franz Boas, appears as *Bulletin* 40, of the Bureau of American Ethnology. It embraces vi and 1,069 pp. and contains, besides the contributions of Dr. Boas, papers by a number of collaborators. This work had its inception in an attempt to prepare a revised edition of the "Introduction to the Study of Indian Languages," by Major J. W. Powell. In Major Powell's introduction there was much linguistic material and many vocabularies, but the essential features of the morphology of American languages

were not known at the time his work was prepared. Special attention is called in the present work to the morphology and phonetics of American languages; and the necessity of an analytical study of grammar is emphasized.

AFRICA

THE EAST AFRICAN CENTRAL RAILROAD. Over 10,000 native laborers are employed in constructing this railroad from Daressalam to Tabora in German East Africa. The road has been completed to Kilimatinde, 374 miles from Daressalam. The track head is still 189 miles from Tabora, but it is expected that the lines will be in operation from the Indian Ocean to that important inland trade center by the end of 1912. Thus far, the Reichstag has provided only for building the line to Tabora, but according to the *Deutsch Ostafrikanische Zeitung* (No. 20, 1911), the extension of the line to Ujiji on Lake Tanganyika is practically assured. This extension will add over 200 miles to the length of the road, making the total length between the Indian Ocean and Tanganyika about 800 miles. When this enterprise is completed and the Belgian Congo extends its Upper Congo R.R. system to the western shore of Tanganyika, as it has decided to do, there will be uninterrupted steam communication by river, lake and rail, east and west across Africa from Banana at the mouth of the Congo, to Daressalam on the Indian Ocean.

TOPOGRAPHICAL SURVEY IN UGANDA. The *Geographical Journal* (April, 1911), reports that a topographical survey party under command of Capt. W. C. Macfie, R. E., arrived in Uganda in February, 1909, and were at work in the country for nineteen months, during which they surveyed 14,000 sq. miles on the scale of 1:25,000. The survey is of exceptional interest, as it completes the first accurate topographical survey of any considerable block of country in tropical Africa. This work, with the earlier surveys, completes a connected area of accurate topographical survey of no less than 32,000 square miles, a region about three-fourths as large as the state of New York. The maps are in course of preparation, and it is hoped that they will be published at an early date. Unfortunately, Lieut. Pennington and Corporal Corner, in the small party of ten men, died from the effects of the climate and the exacting work.

ASIA

CLIMATE OF PALESTINE. The climate of Palestine has long been a subject of interest, not only to students of the Bible, but also to the increasing number of persons who are looking into the question of climatic changes. An important study, "Zum Klima von Palaestina," has recently been published under the auspices of the German Palaestina Verein (*Zeitschr. Deutsch. Palaestina-Ver.*, XXXIII, pp. 107, ff. 1910). The writer is Dr. Felix M. Exner of Vienna. In this pamphlet of 60 pages, Dr. Exner has given a clear, concise account of the climatology of Palestine. The region, as is well known, is in the subtropical belt, and the dominant characteristics are the rainy and dry seasons. The annual rainfall is the most important climatic element from the practical point of view. The annual rainfall is small, and varies much from year to year, as is usual in these border-lands between different rainfall régimes. In general, wet years occur with low pressure over Palestine in winter, and dry years with high pressure. The winter low pressure area of the Mediterranean Sea extends over the coast of Syria, and the greater the eastward extension of this depres-

sion, the heavier is the rainfall over Palestine. The rains come from the Mediterranean, with southwest winds. In summer, on the contrary, the pressure is low in the east of Palestine, over the desert. The resulting west and northwest winds bring relatively cool air in summer. Dr. Exner points out that there are not available enough data regarding the rainfall to make possible, at present, any critical study of the outstanding hydrographic problems. A rainfall chart and two pressure charts are appended. R. DEC. WARD.

AUSTRALASIA AND OCEANIA

THE GERMAN-DUTCH BOUNDARY EXPEDITION IN NEW GUINEA. The completion of the work of this expedition was recently reported. A despatch from Dr. Schultze, printed in the *Deutsches Kolonialblatt* for Feb. 15, adds new details as to the experience of the Commission while ascending the Kaiserin Augusta River, September to November, 1910. After the gunboats reached the limit of navigation the German and Dutch Survey parties went on in small boats assisted for a time by two steam launches. The longitude of 140° 12′ E. (which was 12′ east of the boundary) was reached on Oct. 3, in 4° 4′ 18″ S., and here a camp was formed. An attempt to push northward towards the point reached by the previous land expedition along the 141st meridian proved unavailing, the country being a level swampy plain like that which had hindered an advance from the north. The parties accordingly turned south to continue in boats the exploration of the Upper Sepik which is the name the natives give to the Kaiserin Augusta River. They reached, on Oct. 20, a rock defile by which the river emerges from the mountains. Above this point the river is a rapid, shallow stream, navigable only by light draught canoes. Contrary to expectation it proved to come from the east of south or in German Territory and thus is hardly suited, except for a short distance, to serve as part of the International boundary. It was traced with considerable difficulty to about 4° 49′ S., 141° 15′ E., when the north-west monsoon set in with violence, the rise of the river threatened to cut off retreat and so the return journey was begun. The Dutch party surveyed some of the tributaries while the Germans ascended one of the peaks near the turning point gaining, for the first time, a general idea of the configuration of the country traversed. Towards the west the view extended as far as Mt. Juliana in the Central Snowy Range. The Kaiserin Augusta River has now been ascended for 600 miles and at the farthest point reached appears to come from the direction of the Victor Emmanuel Range. (Condensed from *Geogr. Journ.*, April, 1911, pp. 452-453).

AUSTRALIAN METEOROLOGY. The Australian Commonwealth Bureau of Meteorology has recently published a new rainfall map of New South Wales, showing the isohyets for 5 or 10 inches. At each station the mean annual rainfall is shown in figures, the data being compiled from all yearly records available covering a period of 15 years and over. All figures are revised up to the end of the year 1908. This map for New South Wales is the first of a series, now in course of preparation, which will include all the States of Australia.

The first number (Vol. 1, No. 1) of the new *Monthly Meteorological Report of the Australian Commonwealth* bears date January, 1910, and gives good promise of being a valuable addition to the regular publications of the national weather services. It is especially to be noted that attention is paid to the cyclonic and anticyclonic tracks, and to the control of these areas over the

weather of the month. A rainfall and a temperature map are included. As compared with most other official publications of a similar kind, the Australian report is welcome in being compact, clear, and interesting.

A third publication, by E. T. Quayle, "On the Possibility of Forecasting the approximate Winter Rainfall for Northern Victoria" (*Bulletin* No. 5, March, 1910) deals with the relation of the winter rains to the preceding number of summer monsoon depressions. Some remarkable agreements are brought out, but there are also distinct disagreements, and it is as yet too early to come to any very satisfactory conclusions in the matter. R. DEC. WARD.

EUROPE

THE POPULATION OF GERMANY. The census of Germany taken on December 1st, 1910, shows a population of 64,896,881 persons against 60,641,489 in 1905, 56,367,178 in 1900 and 49,426,470 in 1890. The increase in population in the last five year period was 4,255,392 or 6.56 per cent. The population of the states numbering over 1,000,000 inhabitants each was, on Dec. 1 last, as follows:

Prussia, 40,156,791; Bavaria, 6,876,497; Saxony, 4,802,485; Württemberg, 2,435,611; Baden, 2,141,832; Alsace-Lorraine, 1,871,702; Hesse, 1,282,219; Hamburg, 1,015,707.

POPULATION OF SWITZERLAND ON DEC. 1, 1910. The census of the Republic shows a population of 3,736,685 persons. The area of the Republic being 41,324 square kilometers the density of population is 90 to the square kilometer. In the eighteen cantons with predominant German population the number of inhabitants is 2,591,574, in the five cantons with predominant French population, 867,310, and in the two Italian cantons, Graubünden and Tessin, 277,810. The German cantons show a density of 129, the French of 77, and the Italian of 28 to the square kilometer.

PROF. CORA'S "COSMOS." All geographers will remember the excellent Italian geographical periodical *Cosmos,* established in 1873 and conducted by Prof. Guido Cora. Its publication has been suspended since 1896 but it has again appeared (Serie II, Vol. XIII). Prof. Cora announces that, beginning with January, 1912 *Cosmus* will be regularly published as a bi-monthly. It will maintain the geographical standard that established its reputation from its first appearance. The most conspicuous paper in No. IV, just received, is a geological study by Prof. Federico Sacco, entitled "L'Appennino settentrionale e centrale." The number concludes with an excellent department of book and map reviews.

POLAR

DR. MAWSON'S ANTARCTIC PLANS. Dr. Douglas Mawson, the physicist of the Shackleton Expedition and lecturer on mineralogy and petrology at the University of Adelaide, South Australia, read a paper before the Royal Geographical Society, London, on April 10, on scientific work in the Antarctic, the problems to be solved and the plans of the Australian Expedition which he will lead there about the close of this year. A part of the paper is printed in *Nature,* (April 13, 1911), from which the following information is taken:

"Because," says Dr. Mawson, "the Ross Sea area is more conveniently situated to the south geographic pole, most expeditions to the Australian quadrant have wintered there. This has led to the neglect of the great coast-line

westward of Cape Adare. Our information regarding it is very fragmentary, and for the most part untrustworthy. Properly equipped, an expedition to this region should have no difficulty in achieving great geographical success. In the words of Dr. H. R. Mill, 'It is time, at any rate, that someone should revisit lands discovered by Biscoe, Balleny, D'Urville, and Wilkes.' . . .

"Lying within wireless telegraphic distance of our borders, this region has a special call upon Australians. Alive to the value of scientific data there massed waiting to be collected I have ardently sought for an opportunity to reap the harvest. Captain Scott's programme was too full with the determined efforts in view upon the south geographical pole and King Edward VII Land, to accede to my request to be landed this year with a party at Cape Adare. It was then that Sir Ernest Shackleton proposed to raise the necessary funds, and, with myself in charge of the scientific work, to attack the whole coast-line between Cape Adare and Gaussberg. The plans were published in the press on March 19, 1910, and repeated later in the year. Eventually Sir Ernest Shackleton handed over the command to me.

"We hope to have a complement of fifty men (ship and land party) and proceed south from Australia about the close of this year. Practically every member of the land party will be a specialist in a particular branch of science. Most of the recruiting will be among the graduates of the universities of Australia and New Zealand.

"It is our intention to land several parties with stores and huts, to winter between Cape Adare and Gaussberg, and the ship will return to Australia and New Zealand for the winter, though not remaining idle. It had been our intention of dropping a few men at Cape Adare, for that is the easiest and most accessible landing on the Antarctic continent. The facilities there afforded of coal and stores left by Borchgrevinck's expedition would have further simplified matters. In the light of recent events, of course, this must be eliminated from our programme. It is our special desire to accomplish a complete coast survey between the two points mentioned, and complete the magnetic charting of the region north of the south magnetic pole. The several wintering stations will simultaneously despatch coastal sledging parties on either hand, thus dividing up the task. A special journey will be made inland from our main base on the north coast to the south magnetic pole, thus completing, in conjunction with the former journey in which I participated, the crossing of that corner of South Victoria Land. For the rest, without entering into details, I may say that no branch of science will be neglected."

PHYSICAL GEOGRAPHY

Centers of Action and Seasonal Weather. Within the last ten years numerous studies by Hann, Hildebrandsson, Meinardus, Teisserenc de Bort and others, have shown some remarkable correlations between the location and the development of the great "centers of action" of the earth's atmosphere and the character of the seasonal weather in adjacent, and even in remote regions. The whole subject is one which is receiving an increasing amount of attention. It is one of the most important aspects of the new "world meteorology," as it has been so well called. Curiously enough, although the effect of the smaller cyclones and anticyclones of our daily weather maps upon daily weather conditions has been long known, the effects of the larger, more permanent "centers of action" upon seasonal weather—a perfectly logical extension of this correlation—

have been only recently noted. Along these lines will undoubtedly run the long-range forecasts of the future.

Hildebrandsson has recently published a further contribution to this subject: "Sur la Compensation entre les Types des Saisons simultanés en différentes Régions de la Terre" (*K. Svensk. Vetenskap. Handl.* 45, No. 11). The same author had already suggested that the condition of the ice in the polar seas is the principal cause of a difference in the seasonal types, a matter which is also under investigation at the present time by Mossman, of the Argentine Meteorological Office. Hildebrandsson now calls attention to the fact that there is an opposition, both in winter and in summer, between the north and south of Europe and of North America; probably also between the sub-tropical and sub-polar regions of the Southern Hemisphere, and between the north of Europe and Siberia. There are some regions where the opposite character of the seasons is less pronounced in some years, and these Hildebrandsson finds to be intermediate between the main centers of action, and dependent upon the intensity of the latter. The whole paper is very suggestive of the growing importance of such broad studies of world meteorology. R. DEC. WARD.

THE CYCLONIC UNIT IN CLIMATOLOGY. The importance of the cyclonic unit in climatological investigations, in addition to the conventional units of the day, the month and the year, is emphasized in a recent paper, entitled "The Study of Phenomenal Climatology" (*Quart. Journ. Roy. Met. Soc.*, Jan., 1910), by William Gardner Reed, Jr., of Harvard University. The discussion is based upon a series of thermograph and barograph curves for Nashua, N. H. After some study, it was found that the "temperature belt" (the strip between the lines connecting the crests of the thermograph curve and the troughs of the same curve) furnishes the best criterion for the classification of the cyclonic and anticyclonic units. Five classes of temperature belts are adopted, and a tentative scheme of summarizing the ordinary meteorological data according to these units has been devised. In order to put this scheme into practice, the author makes use of the weather conditions of Boston, Mass., for the first three months of 1909, and analyses them by the five classes of temperature belts. The paper is an interesting original contribution to a subject which is certain to receive more and more attention. Numerous typical thermograph and barograph curves are given, in illustration of the different units. R. DEC. WARD.

PERSONAL

COLONEL P. K. KOZLOFF. This Russian explorer has received the Founders' Medal of the Royal Geographical Society for his explorations in Central Asia, since 1883.

DR. J. CHARCOT. The Royal Geographical Society has awarded the Patron's Medal to Dr. Charcot for his expeditions to the Antarctic Continent, first in 1903-05, and second in 1909-10.

GEOGRAPHICAL LITERATURE AND MAPS

(INCLUDING ACCESSIONS TO THE LIBRARY)

BOOK REVIEWS AND NOTICES

AMERICA

Highways and Byways of the Rocky Mountains. By Clifton Johnson. xi and 279 pp., and illustrations. The Macmillan Co., New York, 1910. $2.

A well written, well illustrated, attractive and generally readable volume having little to do with the Rocky Mountains, as more than half of the chapters are devoted to the Plains States. The author has described the picturesque features of life in the region west of the 100th meridian and has emphasized particularly the life that is passing, as portrayed to him by old settlers. Yet he seems nowhere to have yielded to the spirit of the plains and mountains and does not write as one who has seen beneath the superficial features and gained inspiration from the grandeur of space, the beauty of form, the glory of color and the impressive silence of these vast areas which contain so much that is awe compelling.

The volume is not geographical in tone, as it merely describes in an unsystematic way the striking phenomena of life and scenery, with no thought, seemingly, of portraying wholes or of giving clear-cut impressions that are satisfying to the reader. The book is not informational, evidently by design, and is disappointing. It is not a volume for the expert or the ignoramus, but will be of interest to the person who knows the section with some intimacy, for it will add some sidelights that are not usually brought out. It is a volume for a summer day and a hammock, not for the traveller who is preparing for a trip through the Rocky Mountains. R. E. DODGE.

Myths and Legends of the Pacific Northwest. Especially of Washington and Oregon. Selected by Katharine Berry Judson. xvi and 145 pp., and illustrations. A. C. McClurg & Co., Chicago, 1910. $1.50.

These Indian myths from the Northwest are typical of the child-like simplicity of the race in the face of the forces of nature and, for that reason, they may well find a place in the stages of the mental development of the child of the present. Most of the stories are connected with some physical feature of the country, as Mount Takhoma (?) the chinook wind and the rivers, while others are intended to explain certain animal characteristics as the run of the salmon and some are of a more general nature dealing with the problems of creation. The book is beautifully illustrated with photographs of the locations mentioned and among the fifty pictures are many which depict Indian types and characteristics. "A consistent effort has been made to tell the stories as the Indians told them" with the result of a very limping style which is somewhat tiresome for general reading. The preface is an admirable introduction to the spirit and contents of the book. R. M. BROWN.

The Life and Times of Miguel Hidalgo y Costilla. By Arthur Howard Noll, LL.D., and A. Philip McMahon. vii and 200 pp., portrait of Hidalgo, and index. A. C. McClurg & Co., Chicago, 1910. $1.

Mexican gold coins are stamped with the image of Hidalgo, and a nearly ideal profile it is. In this biography of the Father of Mexican Independence, the material entering into the account of historical conditions which made the life of Hidalgo significant was mined partly in Dr. Noll's previous works, "A Short History of Mexico," and "From Empire to Republic"; but partly it was obtained, with Mr. McMahon's aid, in the City of Mexico, where there is at least one very large private collection of original documents relating to the events of 1810-1811. It is all good material, and the character of Hidalgo—a somewhat idealized image—stands out clearly. We see him, during the years that preceeded the insurrection, laboring earnestly and wisely for the improvement of the oppressed aboriginal population:

"He was assured that the Indians had capacities for something better than slavery in the mines or in the haciendas, which had been imposed upon them by the *conquistadores* with their detestable system of *repartimientos* and *encomiendas,* and which had been continued to his time. His first thought was for their industrial education. He would dèvelop their own industrial resources, and teach them how to value their freedom."

His brief season of triumph, when he led an undisciplined multitude against the Spanish soldiery; his capture and imprisonment, trial and execution—all the essential features of the familiar story are given in this small volume, without elaboration and yet with some details which add new significance to the "Grito de Dolores." Special interest has always attached to events that are presented in Chapter VII, entitled "The Closing Scene":

"The trial of Hidalgo was delayed until he could be formally degraded from the priesthood and so be made subject to military or civil courts. To effect this, a delegate from the Bishop of Durango came to Chihuahua and performed the ceremonies of degradation. The fetters were removed from the prisoner and he was vested again in his priestly habit and presented before the ecclesiastical court thus provisionally instituted. Sentence of degradation was then duly pronounced. After the removal of his official garments, fetters were again placed on the old man and he was presented to the military tribunal to be tried, convicted, and sentenced."

"The heads of Hidalgo, [and his fellow revolutionists] Allende, Aldama, and Jimenez were brought to Guanajuato and placed upon pikes at the four corners of the Alhondiga de Granaditas. Thus a century earlier the heads of traitors had been placed upon the Tower of London. They were to serve as a warning that a similar fate awaited any in Mexico who chose to revolt against the Government, the Viceroy, the *Audiencia,* or the Holy Office. The effect was exactly the opposite of what had been expected. The ghastly heads thus exposed to view served to remind all who saw them that certain men had sacrificed their lives for the cause of the Independence of Mexico; and this aroused public curiosity and public opinion in Mexico upon the subject of personal rights and the meaning of Independence. The heads were removed from the pikes in 1825, when it was supposed that what these men had striven to attain and had fought and died for had been accomplished in Mexico. They were brought to the capital and buried in the apse of the great cathedral under the 'Altar of the Kings.'"

AFRICA

In Africa. Hunting Adventures in the Big Game Country. By John T. McCutcheon. 402 pp., maps and illustrations. The Bobbs-Merrill Co,, Indianapolis, 1910. $3.

Mr. McCutcheon, the well-known cartoonist, tells here the story of a four and a half months' trip in the big game country of British East Africa. The fact that he was an amateur sportsman really adds to the interest of his hunting trip in those fascinating regions. Humor abounds both in the letter press and in the illustrations which include superior photographs and also a large number of cartoons in Mr. McCutcheon's best style. The work will be included among the best African hunting books. It has a distinctive flavor which only a writer and artist of originality could give to it. Mr. McCutcheon got a great deal of fun out of his experiences and seems to have put a large part of it into his book.

Britain Across the Seas. Africa. A history and Description of the British Empire in Africa. By Sir Harry Johnston, G.C.M.G., K.C.B., D.Sc. xix and 429 pp., maps and illustrations. National Society's Depository, London, 1910. 10s. 6d.

The name of the author is recommendation enough to any one who is seeking information concerning Africa. The volume is an account of the occupation by the British of large portions of Africa. It is published under the auspices of the National Society "as it was thought desirable that a concise history of this racial enterprise should be published, which would not be too abstruse for young readers (whose previous knowledge of Africa might be assumed to be elementary), nor yet lacking in technical information to be of service to those who had left studenthood behind, but desired to learn rapidly how all these things came to pass in this continent of black, white and yellow peoples."

Each area of British occupation is treated at some length. The chapters include South Africa with Cape Colony, Transvaal, Rhodesia, Natal and Bechuanaland, a short chapter on the Mascarene Archipelagoes, West Africa and especially Nigeria, Egypt and the Egyptian Sudan, East Africa with Zanzibar, British East Africa, Uganda Protectorate and British Somaliland. An historical review is given for each area. The conditions have given opportunity to many men, and stamped upon the history of the land are many names such as Rhodes, Cromer, Stanley, Grey, Frere and a host of others.

The author, in his preface, suggests that he may not have done justice to his opinions but says that while he believes "that on the whole the British have been more righteous in their dealings with the native races of Africa than have some other of their European rivals, they do not hold the monopoly of virtue and disinterestedness."

More than half of the book is given to the struggles in the development of South Africa and the history of the British occupation there is reported in detail. Whatever of criticism is made against the various acts of the British in their struggle for South Africa, there can be no question concerning the great improvement which has followed the English flag. A chapter on the natives of British South Africa not only gives a catalogue of the tribes but adds an interesting list of names of native chiefs and notables among them, with a brief sketch of their contact with the British occupation.

Then follows an account of the struggles to gain a foothold on the West

Coast. While pepper was the inducement which turned the British to the West African Coast, there is no doubt that the slave trade and the thirst for gold was the incentive which gave the impetus to the seizure of most of West African lands. Here also is treated in detail the history of the explorations and struggles not only with the natives in actual war but also with the hostile nations of Europe in diplomacy which culminated in the accession of this territory. Following, Egypt and the Egyptian Sudan are treated in a similar style and the concluding chapter covers the British countries of East Africa.

Scattered through the book are valuable papers on special topics such as the Classification of Mankind and the division and place of the Negro Race, the Pepper Trade, the Tsetse Fly and Parasitic Diseases, the Products of British South Africa, the Principal Tribes of Nigeria, the Natives of the Egyptian Sudan and the Native Tribes of the British East African Dominion. The book is replete with interesting pictures of every phase of African life, animals, native peoples, invaders, homes, activities and physical features; and seven maps aid the reader in the interpretation of the text. It is a worthy addition to the works previously issued by the author. R. M. Brown.

ASIA

Kientchang et Lolotie. Chinois—Lolos—Sifans. Impressions de voyage, étude géographique. Par Dr. A. F. Legendre. 465 pp., illustrations and map. Plon-Nourrit et Cie., Paris, 1910. Fr. 5.

Dr. Legendre has spent years in China. His book is written for edification rather than amusement. It is the result of careful observation and study relating to the geography and the social and economic conditions in the far western parts of China. His journeys are illustrated by a map showing his routes and a considerable number of photo-engravings. His text conveys a clear idea of large districts in China that have been little known to us. Few writers have given a more complete view of the customs, mentality, and ways of life of any portion of the Chinese race and the book deserves to rank high among works on parts of Asia which are not yet well known.

L'Indo-Chine Française. Cochinchine—Cambodge—Annam—Tonkin. Par L. Faque. 185 pp. and map. Félix Alcan, Paris, 1910. Fr. 0.60.

One of the long series of little works on the Far East, published by Alcan. The book tells the story of French Indo-China from the earliest times, gives the history of the French occupancy, treats rather briefly of the geography of the region and then describes its inhabitants, resources and industries. Though a short work the reader will get a clear idea from it of these peoples, their land, the splendid development work which the French are doing and their high hopes for the progress and the future value to the world of the new realm under their flag.

Cook's Handbook for Tourists to Peking, Tientsin, Shan-Hai-Kwan, Mukden, Dalny, Port Arthur and Seoul. 116 pp., maps, plans and illustrations, Simpkin, Marshall, Hamilton, Kent & Co., Ltd., London, 1910.

The development of railroad travel in the Far East is attracting a considerable number of tourists and some guide books have been issued covering small parts of this region. The present handbook covers most of Eastern China which

has been opened to tourists in the past few years. All the information that will contribute to the comfort and convenience of travelers is given with maps and a vocabulary, in the Pekinese dialect, of words and expressions which will be useful to tourists. Travelers are advised, however, "to show these characters in preference to any attempt to pronounce them as the right tones are difficult to give and a very slight error in tone may alter the meaning of the word." A six days' sight seeing tour of Peking with a description of the places to be visited is one of the features.

Korea. By Constance J. D. Coulson. vii and 85 pp., map and illustrations. The Macmillan Co., New York, 1910. $0.75.

Another of the popular books in the "Peeps at Many Lands" series especially adapted for young readers and beautifully illustrated with colored plates.

Die Japanische Kolonialpolitik. By Fritz Wertheimer. 100 pp., L. Friederichsen & Co., Hamburg, 1910.

A desirable contribution to colonial problems in the Far East. The author derived a large part of his material from his own studies in Japan and its dependencies. Japan's distinctive colonies are Hokkaido, Formosa, Korea, and the southern half of Sachalin Island to which Dr. Wertheimer adds Manchuria though it is not counted politically as a part of Japan. He discusses Japan as a colonial nation, describes each of the colonies, treats of the native and labor questions in them, gives statistics of colonial trade and outlines the policy and purposes of the Japanese colonial system.

Nord-Sumatra. Bericht über eine im Auftrage der Humboldt-Stiftung der Königlich Preussischen Akademie der Wissenschaften zu Berlin in den Jahren 1904–1906 ausgeführte Forschungsreise. Von Prof. Dr. Wilhelm Volz. Band 1: Die Batakländer. xxi and 395 p., 3 maps, 12 plates, 123 text figures, appendix and index. 10 x 7. Dietrich Reimer (Ernst Vohsen), Berlin, 1909. Mk. 18.

Even if this highly valuable document contained naught memorable or new, nothing of note, it would yet in its form remain invaluable as an exposition of the method of field work of the well trained German geographers. Dr. Volz has had the opportunity to open a new terrain, he has been the first in a wholly unbroken field, he has conducted a reconnaisance in a land whose horizon is as new to geography as it was unfamiliar to himself. We have had occasion of late to comment on British exploration in which clear evidence was presented that the pioneer of new lands was provided with a list of ready made interrogatories whose answer he was expected first to discover. The German method leads to far broader results, it is a model well worth the following.

Sumatra has a peculiar importance in geographical and in ethnographical study. Lying so intimately in touch with the continent of Asia it suggests itself at once, and indeed ultimately it proves to be, the channel through which the Indonesian province received its Asiatic contamination of life, vegetal and animal, including in the latter the human as well. Yet in large areas Sumatra has escaped study. The reason therefor is largely political, for the northern tip of the island is dominated by the Atjeh, Acheen of the usual charts, and it will readily be recalled that for a period measurable now by centuries this obstinately intractable folk has obdurately declined the efforts of generations of the Dutch to reduce them to subjection.

Dr. Volz attacked the problem between 1904 and 1906 and has succeeded most valiantly in prosecuting his mission of peaceful science where armed expeditions have been beaten back times without number. Four chapters of his book are the daily record of exploration, the narrative of the penetration of the eastern Karo country, the lands of the Pakpak, the western Karo country, and finally Toba land and Habinsaran. Interesting in itself, this daily narrative is of yet riper value as affording the amplest equipment for the comprehension of the varying local conditions that qualify his more general conclusions. The precision of this initial record affords complete proof that he entered upon his task, so brilliantly performed, with no preconception, with no theory that must be established. The style which beautifies every page shows that in competent hands the diary of march and camp must prove the most picturesque and certainly the most vivid form of presenting the results of any such scientific survey.

Based upon this reconnaissance report the six remaining chapters are rather fairly divided between geognostic discussion and ethnographic conclusion. With great propriety Dr. Volz establishes his geographical record upon the basic geology of the regions which he has explored. Inasmuch as the field of his operations lies close to the equator and under conditions of excessive precipitation we are to find it most appropriate that the author has devoted a considerable chapter, and that by no means the least valuable in a work which is throughout instructive, to a discussion of the morphological signification of aqueous denudation. In such a work as this a chapter adding so largely to our knowledge of this important phenomenon is as timely as are the studies of æolian denudation in the American survey reports of the great Colorado plateau.

In the ethnographical chapters Dr. Volz discovers four strata of population, three Malayan layers superimposed upon a substratum. This substratum has attracted his most lively interest and he has been at great pains to present the result of his investigations with intimate detail. That he has laid bare no recognizable evidences of the ancient Polynesian population of Indonesia accords with the conclusion at which I have arrived through independent investigation that Java and not Sumatra is the most westerly point at which we can feel at all certain of identifying the Polynesian ancestors. Of course their presence in Java argues an earlier passage through Sumatra, and Percy Smith has already pointed out the Polynesian affinities of the Mentawei off the western coast of Sumatra. It is most interesting that this explorer finds in his substratum traces of the primordial Melanesian culture, the use of the bow, the narrow shield, cannibalism and tattooing. The first and the last of these are indeed Melanesian, but we are not yet in a position to determine that they are an exclusively Melanesian possession.

We must regret that the otherwise brilliantly executed chart of the region explored lacks the geographical coordinates whereby the results could most accurately be correlated with existing maps of the region. This is all the more noticeable since Mr. Vohsen, who deals with his charts well nigh reverently, has put this map in the very capable hands of Mulder of Leiden, evidently to insure the correctness of the names, which for obvious reasons are in Dutch.

The concluding volume is shortly to appear and will be heartily welcome. Together they will form a monument worthy of the great Humboldt anniversary which they are intended to honor. WILLIAM CHURCHILL.

AUSTRALASIA AND OCEANIA

Australia: The Making of a Nation. By John Foster Fraser. xix and 299 pp., 56 illustrations. Cassell & Co., London and New York, 1910. $1.75.

The 300 pages of this book include a large amount of material of various kinds, geographic, social, political and ethical concerning Australia as it is today; and in addition the stages in the development of the cities and the industries are discussed. The pictures are many and cover a great variety of themes but in general they depict the best side of Australian life although the text plainly states that there is another side. The story is a double-faced one. "That is always the trouble in Australia. It is the land of extremes. It is the best land in the world and it is the worst land." Some of the chapters describe the cities and the states. The impressions of the cities are told largely by comparisons while the chapters on the states portray, through the stages of the struggle to form settlements, the deeper meaning of the country and comprise the best parts of the book. The author does not hesitate to criticise severely and he is also willing to praise highly so that the reader is impressed by his apparent desire to report the country fairly. There are special chapters on intensely interesting themes; one on the home life of the people presents a study in education and morality that is shocking; another on the problems of the railway shows the futility of the State control, a third on labor legislation is a remarkable presentation of the effects of trades union government, while other chapters cover the problems of immigration, population, settlement and education. Altogether, the writer takes a very hopeful view of the future of Australia notwithstanding the difficulties which are, in part, inherent in the country and, in part, the crudities of the pioneer stages. The account is based largely on personal observation. The book would have been more valuable to the general reader had a number of maps been added. R. M. Brown.

Otahiti. Au Pays de l'éternel Été. By Henri Lebeau. xviii and 259 pp. Librairie Armand Colin, Paris, 1911. Fr. 3.50.

The first impression of this slight volume is that the author has in mind by fine writing to compensate for the fact that his sojourn in Tahiti was compassed in six weeks. But when it is discovered that he criticises sagely and with discretion the South Sea studies of Pierre Loti and Robert Louis Stevenson it is recognized that his trick of fine writing is not assumed to cover any shortcoming. He writes well because he has a dainty taste in the selection of words with which to express his appreciation of the sordid streets of Papeete, indolent in all manner of iniquity, and of the contrasting grace of soul which fills him when his eye sets its gaze away from the dishonor of his own race and the death of the Tahitians and turns to the immemorial strength of the peaks of Moorea dominating the seaward view. His study is a work of no pretension. He sets forth that which it was given him to see in his short stay; he writes always with the feeling that the folk at home should know more than they do about the conduct of affairs in this colony of France in the South Sea. That his work is an indictment of the colonial administration is but an incident, deplorable yet inevitable. Tahiti is over-administered. It has a population of less than 10,000, yet in its annual budget provision is made for the salaries and incidental gratifications of 510 officials of diverse degrees of expensiveness. In comparison set New Zealand's colony in adjacent seas, the Cook Group; for a population of 30,000, three officials are found sufficient. The author follows the topic still

closer to the people. He shows how each tiniest community lives under the surveillance and by the favor of the omnipresent gendarme. With 510 salaries to pay, with an exorbitant system of licenses, with police restriction set upon all business and pleasure, the Tahitian finds life too expensive to come within his means. Hopeless of the future he settles down into apathy for the present, a victim of tyranny from above and sapped by vices from below, the Tahitian finds it cheaper to die, and being a Polynesian he is quite content to die and be out of it. Mr. Lebeau spent his six weeks to good purpose. His book is a trifle, yet it is valuable as a corrective of the visionary and poetical accounts of Tahiti which men of greater note have seen fit to present as the story of a dying race.

WILLIAM CHURCHILL.

Eastern Pacific Lands: Tahiti and the Marquesas Islands. By F. W. Christian. 269 pp., 64 plates and index. Robert Scott, London, 1910. 7s. 6d.

Somewhat more than this was to be expected of the author of a really valuable study of the Caroline Islands. The inclusion in this volume of the Earl of Ranfurly's mediocre report on the annexation of the Cook Islands seems like padding. Mr. Christian's own narrative is the trivial record of brief visits to the two groups noted in the title. Tahiti is so well reported that even the best record of a short sojourn can add nothing to our knowledge. The Marquesas, on the other hand, have been so scantily studied that it is tantalizing to find that an observer of such long experience in the South Sea as Mr. Christian has proved so little observant. The volume will be a necessity to such as specialize in the geographical province of Oceanica, but it will add little in return for the space which it will occupy. Much of the work is devoted to comment on Stevenson and Herman Melville; the author's estimate of these predecessors scarcely makes up for the paucity of his own observations in the field.

In two appendices Mr. Christian has conveniently assembled topically the more valuable results of his investigation. He expresses himself somewhat positively in favor of the theory of an Aryan origin of the Polynesians and arranges several sets of linguistic data as confirmatory of that opinion. He accedes as well to the opinion of other students that the designation of the Malayo-Polynesian family is false. Yet it is noticed that in this material brought together to establish Aryan origin the author has set forth resemblances of the Marquesan speech with Japanese, Malayan and even Semitic; and such remote resemblances are scarcely to be considered as proof of any one source in particular, for these are surely remote from the Aryan.

The illustrations are of uneven value. Several reproduce originals which are now almost inaccessible. The best are such as represent artifacts of the Marquesas which exhibit variants upon more familiar types.

WILLIAM CHURCHILL.

Through Tropic Seas. By Frank Burnett. With an introduction by Bram Thompson. xii, 157 pp. and 68 illustrations. Francis Griffiths, London, 1910. 7s. 6d.

Mr. Burnett bought a little schooner and with his family went on a cruise among the South Sea Islands. He had visited them before and this book is the result of his extended observations of the islands and their inhabitants. It is not a commonplace record of travel. The author tersely describes what he saw. He minces no words in dealing with various aspects of the natives and indulges

in some pungent criticisms of the missionaries of to-day who, he says, are self-seeking, intolerant, uncharitable and particularly injudicious in the handling of the natives. The book gives a sharper and clearer view of the essence of many things Polynesian than we often meet with in mere travel literature.

The New Guinea. By Beatrice Grimshaw. viii and 322 pp., 49 illustrations, map and appendix. J. B. Lippincott Co., Philadelphia, 1911. $3.50.

Somehow we suspect that Miss Grimshaw is losing her interest in the South Seas and her once beloved cannibals. This New Guinea volume lacks the freshness of the volume in which she set forth her introduction to the eastern islands, it has little of the sympathy of the volume in which she passed in review Fiji and the New Hebrides, there is none of that fellow feeling which rioted in her stories of Vaiti of the islands. To be sure she does find her cannibals in the wild west of Papua, as we are now to call British New Guinea, and she shudders a little at sight of their peculiar viand. Miss Grimshaw has scampered along the whole Torres Straits littoral of Papua, she has even exceeded the geographical scope of Dr. Seligmann's study of the region to which the student will turn for the facts. At the extreme west she has been the first European woman to penetrate the extremely long tribal houses in whose gloomy recesses she rather expected to be dined upon; in the extreme east of the Louisiades she has foregathered with those cheerful murderers who kill with their hands, eager fingers throttling throats. But the zest has left her, she has seen so much of the wild life that it has become an old story. For the first time we find her of set purpose educational, instructive. She discusses those topics which properly belong in a guide to intending settlers. She sets forth the terms and conditions upon which waste land may be taken up for settlement, she has her word to say about the supply of labor, she exhibits familiarity with the clearing of the virgin forest, she discourses upon the proper crops to set and the utilization of the land by catch crops while awaiting the maturity of the principal crop. Touched by the echo of the rubber craze which has seized the British market of rapid finance she has her advice to give as to the best rubber to grow, incidentally she spells the name of the Brazilian plant inaccurately and the same slipping tendency in orthography will foil those who seek many of her place names on the maps of New Guinea. This sort of information is valuable, it is well to bring it within the reach of those who seek to know more of this little known island; the disappointment lies in the finding that this spirited traveler has at last come down to writing with a blue book at her elbow. Strange irony of fate! The keynote of this book is that the British province of Papua has been made safe at last by the prudence of its administrator.

WILLIAM CHURCHILL.

EUROPE

The High Roads of the Alps. A Motoring Guide to One Hundred Mountain Passes. By Charles L. Freeston. xv and 388 pp., 106 itineraries, 102 photographic illustrations and 11 maps and diagrams. Kegan Paul, Trench, Trübner & Co., Ltd., London, 1910.

Mr. Freeston's ideal tour takes us to Geneva, into the French Alps about Grenoble, over to Turin, back to Mont Cenis, to Chamonix and Geneva again. Thence across the Foreland north of the Swiss Alps to the Tyrol. Thence over the Stelvio, "the goal of the motorist's aspirations," into Italy and back to

Geneva by the Simplon. Beautiful roads in the non-Swiss Alps but the Swiss high places are closed to motor-cars. He is plainly annoyed about this; it crops out in every chapter. The Swiss are afraid the awkward horse diligence will be upset, though they have no trouble in Austria, Italy or France. The stupid Swiss peasant has too much to say about local affairs and when he makes concessions on a few routes where the diligence service has ceased to exist he is not graceful about it. Thus on the Simplon a stamped time on your papers compels you to put in four hours on the 26 mile road from Brigue to Gondo! You may take your motor up the Swiss side of the Great St. Bernard *if a horse draws it!* This the author finds ridiculous. He is first and foremost a motorist. He revels in the free sweep of a high powered car that can devour the dull spaces. He advises about motor details. With a wide steering lock you may ascend most passes in perfect safety, even the 9,000 foot Stelvio. The Splügen, though lower, has corners so sharp that its ascent is a sporting feat, but that is exceptional.

He expresses very definite opinions. He scorns British roads as narrow, ill graded and abounding in hidden turns. He admires the superb National Roads of France that allow you to cross the country faster than the train can take you. He "notes with regret that an electric railway now runs across the Bernia Pass." He feels that railroads are allowed to cross the highways too freely. Horse drawn diligences are destructive of roads. Motor cars do them no harm. But he is a good traveler. He knows the value of careful study of your route. He gives details of a hundred passes he has crossed, motor details. He loves fine scenery and knows that high peaks or passes are not always the best viewpoints. His photographs make a charming selection of Alpine landscapes. He enjoys especially the Dolomites, the Lukmanier and Grimsel passes, the Simplon summits and the beautiful French Alps about Grenoble.

Heights and distances and all travel details are given clearly. Surely the motorist in the Alps will find this guide indispensable. MARK JEFFERSON.

The Norfolk and Suffolk Coast. By W. A. Dutt. 413 pp., illustrations and index. Frederick A. Stokes Company, New York, 1910. $2.25.

The author says of the Norfolk and Suffolk coast that the only thing permanent about it is change. He mentions a village that he knew twenty years ago and says the waves of the North Sea now beat on a shingly shore at the place where it stood. As the official investigation of the changes of British coast lines has shown, this is a part of the coasts of England which has especially suffered from assaults of the sea. The book tells of these wasting coasts, the life of the people who live along them, great fishing ports such as Lowestoft and Yarmouth, growing watering places such as Gorleston, picturesque and historic regions, the marshlands and fens and the wild life of the country. This is one of "The Country Coast Series" in which all the coasts of England are being described.

A Literary and Historical Atlas of Europe. In "Everyman's Library." By J. G. Bartholomew, LL.D. xiv and 253 pp. E. P. Dutton & Co., New York, 1910.

The object was to provide the literary and historical student with the geographical data to illustrate the books he is reading. A similar atlas will be published of each continent. The small volume covers the essentials of European geography, defining not only frontiers and countries but also illustrating

history and literature. Ninety-six pages of colored maps show the changes that have marked the growth of European nations from the Middle Ages to the present day. Thirty-two pages of black outlines illustrate great battles of the world or relate to English literature, etc. There is, for example, a special map of the Lake District of England because this region is associated with Wordworth, Coleridge, Ruskin and other authors. Another map gives places mentioned in Dickens's works. The maps are followed by a Gazetteer of places in Europe having a literary or historic interest and also a long list of geographical names giving the latitude and longitude of each place so that it may easily be found on a map.

Les Ports de Paris. Par Auguste Pawlowski. x and 156 pp. and 27 illustrations. Berger-Levrault & Cie, Paris, 1910.

The author treats the Seine and its tributary channels and canals as parts of one enormous basin with a single port, Paris. An exhaustive study is made of these waterways, all tributary to the port of Paris and carriers of its mighty commerce. The book gives an excellent idea of the commercial importance of the Metropolis as influenced by water communications.

Landeskunde von Frankreich. Von Dr. Richard Neuse. Vol. I, 140 pp., 39 maps, profiles, diagrams and photo-engravings. Vol II, 145 pp., 49 maps, profiles, diagrams and photo-engravings. G. J. Göschen'sche Verlagshandlung, Leipzig, 1910. Each, 80 pfg.

A good description of France in all geographical relations, printed in comparatively small compass, but with content so methodically arranged, clearly and adequately expressed and so well illustrated by black maps in the text, a good map in colors and many photo-engravings, that the little volumes will be found very helpful.

The Spaniard at Home. By Mary F. Nixon-Roulet. 321 pp. and illustrations. A. C. McClurg & Co., Chicago, 1910. $1.75.

The author is intimately acquainted with the Spaniards, has a sympathetic understanding of their temperament and her charming volume is written *con amore*. She discusses Spanish manners, customs and institutions, not as a casual observer but as one who has lived among this people and loves them. The book will give new light to many a reader who has only a superficial knowledge of Spanish character and institutions. Many who have not known the Spaniards intimately have held very inaccurate views of them and done scant justice to their admirable qualities and their great achievements in various lines of endeavor. This book will tend to correct such misapprehensions.

All peoples have their failings but, so far as the Spaniards are concerned, this book throws little light upon their weaknesses or upon any peculiarities that are not admirable; in other words the author deals almost entirely with the sunny and commendable features of Spanish life and character. To this extent the book may perhaps deserve some criticism. Among the topics are Infancy and Childhood in Spain, Courtship and Marriage, Women and Family Life, Amusements, Society, Church and Charity, Education, Literature and the Fine Arts, and Industries. The photo-engravings have been well-selected and produced.

POLAR

British National Antarctic Expedition, 1901–1904. Meteorology. Part I. Observations at Winter Quarters and on Sledge Journeys with Discussions by various authors. Prepared under the superintendence of [W. N. Shaw] the Director of the Meteorological Office with the cooperation of a Committee of the Royal Society. xiv and 548 pp., 14 plates and 7 maps. Royal Society, London, 1908.

The volume contains the chief part of the results of the meteorological observations made by the Antarctic Expedition of Commander R. F. Scott. The data of the observations at winter quarters and on the sledge journeys are printed in full (pp. 17-364) with maps prepared by Lieut. Mulock to illustrate the geographical positions. Mr. Shaw in his preface gives the salient features of the climate according to the two years' experience of the explorers. Plates 2-5 are representations in colors of prismatic halos around the sun and other solar phenomena.

EDUCATIONAL GEOGRAPHY

Commercial Geography. By Edward Van Dyke Robinson. xlviii and 455 pp.. maps and ills., index and appendix. Rand, McNally & Co., New York, 1910.

Readable, concise, statistical without being dry would apply to the text book of Commercial Geography by Prof. E. V. Robinson, Professor of Economics in the University of Minnesota. The author in his preface, holds that the subject treats of the localization of industries with respect to three sets of controls—the natural (geographic), the human and the economic, and that any factor can be neglected only under the penalty of the subjects becoming a mass of disconnected facts.

The treatment is divided into two phases: (1) the growth and factors of commerce and (2) regional descriptions including the commercial world, the proportion of space given to them being about one to four. The history of commerce, land and sea factors, climate, man, economic forces, transportation and raw materials make up part 1. Soils, topography, forests and coast lines are treated briefly as land and sea factors. Climate is well but very briefly treated. Race, religions and customs, language, nationality and governmental activities are the topics on human factors. Elementary economic principles of maximum, minimum and decreasing returns, war and substitution products form a short chapter. Other chapters are given to transportation and raw materials.

Part 2 is a regional description of the commercial world of which about one-half is rightly given to the United States. South America, Asia, Africa and Europe are taken in order. A final chapter deals with the principal industries of the world.

A pressing problem of a text book author is that of elimination. Out of the wealth of material, the important facts must be gleaned and emphasized. The book under review shows an advance over most others in this respect, although a rough estimate shows descriptions of over 200 commercial products and over 500 cities. However, the author in the case of the more important cities, especially those of the United States, describes them in terms of their environment. Indeed the geographic analysis of cities is one of the most valuable features of the book.

Ten pages are given to a condensed but fairly clear description of the

climates of the world. While the discussion is clear to one who has had some training in physical geography it is doubtful whether the secondary school student will get a working knowledge of climate from the author's presentation. He is more likely to obtain a vocabulary than an understanding, and an understanding is especially necessary since consistent reference is made to climatic factors in the discussions. The same comment applies to the discussion of physiographic features but this element is not so vital since less reference is made thereto in the regional descriptions. Perhaps the reviewer is prejudiced but it would seem that some details of products and places could be omitted and more adequate treatment of geographic factors substituted since those factors are basal to most of the regional descriptions. A misconception may be noted in the discussion of the Fall Line, page 116, which is described as a place "where the ocean formerly beat against the land," the inference being apparently that the Fall Line is a wave cut cliff instead of being due to the fact that the rivers, passing from the hard rocks of the Appalachian belt to the softer rocks of the Coastal Plain, more rapidly wear away the softer rocks, forming falls and cataracts. The book, in some respects is an advance on other text books on this subject. F. V. EMERSON.

Industrial and Commercial Geography. By Charles Morris. iv and 323 pp., maps and illustrations. J. B. Lippincott Co., Philadelphia, 1910. $1.10.

Of the thirty-one chapters in Morris's Commercial Geography, one each is given to general principles, the adaption of the earth to man's residence, industrial development, historical review, transportation, origin of industrial centers and one chapter to the climate and physiographic regions of the United States. Ten deal with the commercial products of the United States, thirteen with foreign countries and a final chapter, with the migrations of mankind.

It will be seen that the bulk of the book is descriptive and a large proportion is properly given to the United States. The style is direct and readable and the matter is elementary, evidently intended for students of about the ninth grade.

It will scarcely be disputed that commercial geography should deal for the most part with the important facts of commercial and industrial activity and that these facts should be explained as far as possible in terms of the underlying factors of economics and of physical geography.

In respect to the latter factor, the book, in the reviewer's judgment is open to considerable criticism, first, as to the sufficiency of treatment and, second, as to its accuracy.

Only a few paragraphs are given to climate and the principles are not considered. Rainfall, temperature and winds are presented as uncorrelated items. The surface features are somewhat more adequately treated but without a map showing the physiographic divisions. It is difficult to see how a reader could gain a clear idea of the geographic relations that are so vitally important to commerce and industry. New England's water power is mentioned but the relation to glaciation is not brought out. Indeed in a casual reading, no mention of glaciation or its far-reaching influences is found. The Fall Line is not mentioned specifically although the group of cities where the "rivers descend" is spoken of.

Besides the mode of treatment, one feels that the author has not an adequate knowledge of the geographic factors; and inaccuracies of statement or inference are not infrequent. The mild climate of the Northern Pacific coast of the

United States as compared with the same latitudes in the Atlantic coast is said to be due to the fact that "the Pacific yields warmer winds than the Atlantic" (page 55). The influence of the westerly drift is evidently not suspected. The idea that mountains are necessarily metalliferous is inferred (page 23).

As a geographic reader the book has some value. The illustrations are interesting although they do not especially illustrate the text and but seldom is reference made to them. The chapter on cities from a geographic point of view is well written. F. V. EMERSON.

Elementary Physiography. By Rollin D. Salisbury. xi and 351 pp., maps and diagrams, profiles and other illustrations. Henry Holt & Co., New York, 1910.

This is an abbreviated edition of the author's Briefer Course and is intended for schools in which only half a year is given to the subject. The terse, vigorous style and logical arrangement which characterize Prof. Salisbury's text-books are retained in the shorter volume.

The author has shortened the course not in general by omitting topics but by abbreviating and simplifying them. This leaves a large number of topics to be assimilated by the high school student in about four months. It is probable that better results would be obtained by amplifying a smaller number of the more important topics.

A valuable feature that has been retained almost in its entirety in the shorter volume is the discussions of the life relations to the various inorganic factors and these discussions are especially valuable in that the instances are specific instead of general. Prof. Salisbury in his latest text-book does not follow some geographers who would lay more emphasis upon life responses and less upon physiographic processes and results. The life element, although excellently treated forms an incidental rather than a vital part of his discussions. The illustrations are well chosen and are so used as to form an integral part of the text. F. V. EMERSON.

PHYSICAL GEOGRAPHY

Descriptive Meteorology. By Willis L. Moore, LL.D., Sc.D., Chief of the United States Weather Bureau. pp. xviii—344. Charts 45. Figs. 81. D. Appleton & Co., New York, 1910.

Seventeen years have elapsed since the publication of Professor W. M. Davis's admirable "Elementary Meteorology," and fifteen have gone by since Dr. Frank Waldo gave us his smaller book, with the same title. Both of these books have done excellent service. There has, naturally enough, been a growing demand for a newer text-book of meteorology, in English, presenting the recent developments of a science which has advanced with such remarkable rapidity during the last ten or a dozen years. The time was most opportune for the publication of Professor Moore's "Descriptive Meteorology," which we feel sure will meet a very general need on the part of a large number of teachers and students all over the United States. The author's object was "to provide, so far as possible, the young men entering the service of the United States Weather Bureau with a comprehensive introduction to modern meteorology," but, as the author rightly says, "to meet their needs in this particular is to provide equally well for all others who are beginning seriously this important science."

We welcome the new book. It will do good work in advancing the study of the science of the atmosphere. Professor Moore has covered the usual ground,

and has done it well. He has given rather more space than is perhaps necessary to the physical conditions and processes at the beginning of this book; to the composition of the atmosphere, and to optical phenomena. He has dismissed with comparatively brief mention such important topics as the distribution of temperature and pressure over the earth's surface. It is perfectly natural, in view of the author's position as Chief of the Weather Bureau, and of his main object in writing the book, that special emphasis should be laid on the work of his colleagues in the Weather Bureau and on the work of the Bureau itself. We cannot help feeling that too much space has been devoted to Professor Bigelow's investigations of cyclones and anticyclones, of vortex phenomena, and of the general circulation of the atmosphere, important as these studies are. There is, it should be noted, but scant reference to recent European work along similar lines. The general reader will, we are afraid, gain a somewhat one-sided view of some of the recent advances in meteorology if he confines his studies to Professor Moore's book. In other words, the Weather Bureau tinge is somewhat too pronounced.

For teaching purposes, the "Descriptive Meteorology" lacks something of the logical and systematic arrangement which is characteristic of Professor Davis's earlier book. There is also a rather striking lack of adequate explanation of many rather essential subjects, such, for example, as the deflective effect of the earth's rotation. We regret to see the classification of the winds given as permanent, periodic and non-periodic. But it is not the province of a reviewer to pick out small details which he himself happens to dislike. In spite of what seem to us some rather regrettable faults, Professor Moore's book is one which will certainly receive, and deserves to receive, a hearty welcome. It will serve, and serve well, to disseminate among a large number of earnest students sound meteorological knowledge. And it will doubtless be read with great profit by many persons who have been waiting for just such a book, and who can in no sense be called students of meteorology. It will fill the need which, during the past ten years, has been increasingly felt by a larger and larger number of our teachers who are concerned either with meteorology directly, or with the larger number of our teachers who are concerned either with meteorology directly, or with the larger aspects of general geography. We call particular attention to the short bibliographies which are placed at the end of all the chapters, and will prove extremely useful. The important work of Professor W. J. Humphreys on the temperatures of the free air is well summarized in Chapter VIII. The chapter on Forecasting is particularly clear, interesting, and well illustrated. This chapter will prove very helpful to the general reader.

We cannot help expressing regret that an American text-book of meteorology should make such inadequate mention of the admirable work done at the Blue Hill Observatory, under the direction of Professor A. Lawrence Rotch, during the past twenty-five years. And we also wish to point out that a book which weighs, as this one does, about three pounds, is a striking illustration of the extreme inconvenience which our American publishers cause their readers by reason of the continued use of wholly unnecessarily heavy paper.

R. DEC. WARD.

Physische Meereskunde. Von Prof. Dr. Gerhard Schott. 143 pp., maps, illustrations and index. G. J. Göschen'sche Verlagshandlung, Leipzig, 1910, 80 pfg.

An excellent compendium of oceanography by one of the leading authorities on the subject. After a short history of the development of the physical study of

the sea, Dr. Schott treats of sea depths and the methods of measuring them, the forms of the sea floor, the area and volume of the sea, the physical-chemical characteristics of sea water, its salinity, gas content, color and transparency, distribution of temperatures at the surface and in the depths, ice conditions, currents and other phenomena of the movements of sea water, causes of the ocean streams, etc. Good maps and other illustrations and an index add to the value of the work.

GENERAL

Karanog. The Romano-Nubian Cemetery. By C. Leonard Woolley and D. Randall-Maciver. Vol. III. Eckley B. Coxe Junior Expedition to Nubia. xi and 286 pp., illustrations and index. Vol. IV, Plates. 115 plates and plan. Univ. of Pennsylvania, Egyptian Dept., of the Univ. Museum, Philadelphia, 1910.

These volumes are part of a series that will record the results of the explorations in Egypt planned and financed by Mr. Coxe of Philadelphia. The expeditions are being conducted on behalf of the University and the antiquities obtained will form part of the collections of the University Museum. The authors of these reports are Curator and Assistant Curator of the Egyptian Department of the Museum who are conducting the excavations. The archæological discoveries which they made near the village of Anibeh on the Nile, are described in the text and the second volume is filled with photo-engravings and colored plates showing a large variety of objects which they unearthed. A representative series of painted pottery and bronzes were retained by the Egyptian Government and the remainder were taken to Philadelphia.

The Evolution of Worlds. By Percival Lowell, A.B., LL.D. xiii and 262 pp., and illustrations. The Macmillan Co., New York, 1909. $2.50.

A revised edition of the course of lectures delivered by Prof. Lowell before the Massachusetts Institute of Technology in February and March, 1909. He presents in them the most recent facts and speculations concerning the past and future of the solar system, discusses the inner and outer planets and their formations and advances some theories that are not widely accepted.

The Fight for Conservation. By Gifford Pinchot. vii and 147 pp. Doubleday, Page & Co., New York, 1910. 60c.

In the solution of the problems of Conservation as a basic proposition, Mr. Pinchot finds the remedy for many of our national issues, such as the improvement of the life of the farmer, the security of business, the increase of morality, and the education of the children. The book is based on a series of addresses made at various times and in this, no doubt, lies the explanation of the repetition of arguments and conclusions which appear constantly throughout the book. Compared with the book recently put on the market by Van Hise, it is inferior. It deals more in platitudes and leans too optimistically on the belief that this movement will cure our national ills. There is, however, power in the book even if one fails to follow the writer into the distant future; and in certain sections where the author is dealing with the issues of his calling, there is inspiration.

R. M. Brown.

NEW MAPS

NORTH AMERICA

United States Geological Survey Maps

Topographic Survey Sheets:

Georgia-North Carolina-Tennessee: Ellijay Quadrangle, 1:125,000 (1.97 miles to an inch). Contour interval, 100 ft. (35°-34° 30′ N.; 84° 30′-84° W.).

Minnesota: Barrett Quad., 1:62,500 (0.99 mile to an inch). Interval, 10 ft. (46°-45° 45′ N.; 96°-95° 45′ W.); Herman Quad., 1:62,500. Interval, 10 ft. (46°-45° 45′ N.; 96° 15′-96° W.).

New York: Neversink Quad., 1:62,500. Interval, 20 ft. (42°-41° 45′ N.; 74° 45′-74° 30′ W.).

Ohio: New Lexington Quad. 1:62,500. Interval, 20 ft. (39° 45′-39° 30′ N.; 82° 15′-82° W.).

Pennsylvania: Butler Quad., 1:62,500. Interval, 20 ft. (41°-40° 45′ N.; 80°-79° 45′ W.).

Texas: San Marcos Quad., 1:125,000. Interval, 20 ft. (30°-29° 30′ N.; 98°-97° 30′ W.).

Utah: Frisco Special Map. 1:62,500. Interval, 50 ft. (38° 32′-38° 23′ [21′] N.; 113° 21′-113° 3′ W.).

Wisconsin: Winnebago Special Map. 1:62,500. Interval, 10 ft. (44° 15′-43° 45′ N.; 88° 34′-88° 15′ W.).

Alaska. Index Map of Alaska Showing Areas Covered by Topographic Maps. 1:5,000,000 (78.91 miles to an inch). March, 1911. [Distinguishes between areas covered by exploratory maps (1:625,000), reconnaissance (1:250,000), and detailed (1:62,500) surveys. Contains a list of maps of Alaska published by the U. S. G. S. and, on the reverse, a list of Recent Survey Publications on Alaska.]

Maine. Map Showing the Distribution of Granite and Related Rocks in Maine and locations of quarries in pegmatite deposits. 1:1,000,000 = 15.78 miles to an inch. 4 colors. Illustrates *Bull.* 445 "Geology of the Pegmatites and Associated rocks of Maine," by Edson S. Bastin. Washington, 1911.

Pennsylvania. Economic and Structural Map of the Johnstown Quadrangle, Pennsylvania. 1:62,500 (0.99 mile to an inch) (40° 30′-40° 15′ N.; 79°-78° 45′ W.). Contour interval, 20 ft. Plate 1 of "Mineral Resources of Johnstown, Pa., and Vicinity," by W. C. Phalen and L. Martin (*Bull.* 447). [Shows coal and clay out crops and structural contours, detailed section through the Carboniferous of Pennsylvania and a list of mines with numbers referring to location on the map.]

U. S. Hydrographic Office Charts

Pilot Chart of the North Atlantic Ocean, April, 1911.
Pilot Chart of the North Pacific Ocean. June, 1911.

U. S. Weather Bureau Charts

Meteorological Chart of the North Atlantic Ocean, June 1911.
Meteorological Chart of the South Atlantic Ocean, June, July, August, 1911.
Meteorological Chart of the North Pacific Ocean, June, 1911.
Meteorological Chart of the South Pacific Ocean, June, July, August, 1911.
Meteorological Chart of the Great Lakes, June, 1911.
Meteorological Chart of the Indian Ocean, June, 1911.

U. S. Department of Agriculture Maps

New York: Soil Survey of Washington Co., N. Y. 2 sheets. 1:62,500.

Pennsylvania: Soil Map of S. W. Pennsylvania. Scale 1 inch = 4 miles (1:253,440). [Embraces Beaver, Butler, Clarion, Jefferson, Washington, Allegheny, Armstrong, Indiana, West Moreland, Greene and Fayette Counties. Accompanies "A Reconnaissance Soil Survey of S. W. Pennsylvania," by H. J. Wilder and C. F. Shaw, Bureau of Soils, Dept. of Agriculture, Washington,

1911. Distinguishes in 10 tints between residual (4), glacial (1), colluvial (1) and terrace and bottom land (4) soils. Relief suggested by symbols for "steep broken" and "rough mountainous" topography.]

Washington: Soil Survey Maps of the Eastern part of the Puget Sound Basin. 4 sheets. 1:125,000.

ALASKA. Sketch Map of Alaska showing Distribution of Forest, Glaciers and Snowfields. 1 inch = 150 miles. 4 colors. Illustrates "The Forests of Alaska," by R. S. Kellogg, in *Bull.* 81, Forest Service, U. S. Dept. of Agric., Washington, 1910. [Colors show distribution of timbered and sparsely timbered areas, regions above timber, glaciers, snowfields and tundra.]

CALIFORNIA. Geological Map of the Sargent Oil Field, Cal. 1 inch = 1,400 feet. 14 colored symbols show geological formations; distribution of oil wells indicated. Illustrates Univ. of Cal. Publ. *Bull.* of the Dept. of Geol., Vol. 6, No. 3, Berkeley, 1911.

NEW YORK. (*a*). The Catskill and Croton Water Supply Systems of New York. [Sketch map showing supply systems and the aqueducts connecting them with the city]; (*b*) Revised areal geology of Southern Manhattan Island and the adjacent margin of Long Island. 4 colors. [Based upon exploratory borings to June 25, 1910. A blue line marks the course of the tunnel intended to carry the Catskill water to Brooklyn]; (*c*) Map showing geologic formations along the proposed lines for distribution conduits. 6 colors. Illustrates "Geology of the New York City (Catskill) Aqueduct," by Charles P. Berkey. N. Y. State Mus. *Bull.* 146, Albany, 1911.

CANADA. Standard Topographical Map. 1:250,000 (3.95 miles to an inch). Dept. of the Interior. Sheet 3, N.W. (Ontario: Kingston Sheet. 45°-43° 15′ N.; 77°-75° W.).

CANADA. Map of Canada. Minerals. 100 miles to one inch. (1:6,336,000.) Geological Survey of Canada, Map No. 1042. To accompany Reports Nos. 1085 and 1086. 1909. [Shows, by colors, on the base map compiled in the Chief Geographer's Office, Dept. of the Interior, the distribution, areal and topical, of 32 minerals.]

CANADA. Map of Canada. Geology 1:6,336,000 (100 miles to an inch). Geological Survey of Canada, Map No. 1084. To accompany Geological Publications, Nos. 1085 and 1086. 1909. [A valuable general geological map of Canada, superseding the larger two-sheet map of older date.]

CANADA. Index Map to Townships in Manitoba, Saskatchewan, Alberta and British Columbia. Scale, 35 miles to an inch. (1:2,217,600.) Accompanies the Annual Report of the Topographical Surveys Branch, 1909-10, Dept. of the Interior, Ottawa, 1911. [Latest edition, brought down to April 1, 1910, of the map showing the subdivisions of the public land of Western Canada into townships. It is indispensable for locating townships, of which township and range numbers are given, but would prove more serviceable if the geographic coordinates were shown. This would require no additional work as they necessarily have been constructed as the basis for plotting the map.]

CANADA. Sketch Maps (Scale 6 miles to an inch [1:380,160]). Showing Topography of:

1. the 18th Base Line, from Range 9 to Range 14, W. of 6th Meridian, Alberta (about 55° N. near 120° W.).
2. the 17th Base Line, from Rge. 27 W. of 5th Mer. to Rge. 9, W. of 6th Mer., Alberta (about 54½° N., west of 118° W. for 48 miles).
3. the 16th Base Line across Rges. 1, 2, 3 and 4, W. of the 6th Mer., Alberta (about 54° N., west of 118° W. for 24 miles).
4. the 3rd Meridian from Township 52 to Township 60 and of the 16th Base Line between the 3rd and the 4th Meridians, Saskatchewan. (106° W. from 53½° to 54° N., and 54° N. from 106° to 110° W.).
5. Part of the 4th Mer., Tp. 63 to Tp. 80 (110° W. between 54½° and 56° N.).
6. the 15th Base Line between the 3rd and the 4th Mer. Saskatchewan (about 53¾° N., between 106° and 110° W.).

7. the 15th Base Line across Rges. 25, 26 and 27, W. of 5th Mer. and Rges. 1 to 8, W. of 6th Mer., Alberta (about 53¾° N. for 18 miles E. and 48 miles W. of 118° W.).

8. the 10th Base Line across Rges. 8, 9, 10 and 11, W. of 5th Mer., Alberta (about 52° N. near 115° W.).

9. the 9th Base Line across Rges. 8, 9 and 10, W. of 5th Mer., Alberta (about 51½° N. near 115° W.).

[These nine maps accomapny the Annual *Report* of the Topographic Surveys Branch, 1909-10, Dept. of the Interior, Ottawa, 1911, and illustrate the separate reports of the Dominion Land Surveyors. Drainage in blue, relief in brown shading, in contour manner.]

SOUTH AMERICA

BOLIVIA. The River Heath and Adjacent Territory. 1:500,000 = 7.89 miles to an inch. By Major P. H. Fawcett, R. A. 4 colors. With section of the Inca Mining and Rubber Co's. Road. 1 inch = 32 miles with vertical scale exaggerated ten times. Illustrates paper "Further Explorations in Bolivia: The River Heath," same author. *Geogr. Journ.*, April, 1911.

CHILE. Mapa de Chile. 1:500,000 (7.89 miles to an inch). Officina de Mensura de Tierras. Edicion Centenaria. Santiago, 1910. Sheets [no individual title] (*a*) 17°-19° S., 70° 50′-68° W.; (*b*) 41°-43° S., 75°-71° W.; (*c*) 43°-45° S., 76°-71° W.; (*d*) 45°-47° S., 76°-71° W. [Relief in brown shading, drainage in blue, culture in black and red, the latter for boundaries.]

AFRICA

EGYPT. Topographic Map of Egypt. 1:50,000 (0.79 miles to an inch). Survey Dept. of Egypt. Sheets XXXVII—V. S. E. (El Derr: 22° 48′-22° 36′ N.; 32°-32° 15′ E.), XXXVII—VI S.E. (Korosko: 22° 48′-22° 36′ N.; 32° 15′-32° 30′ E.), XXXVIII—IV S.E. (Toshka: 22° 36′-22° 24′ N.; 31° 45′-32° E.), XXXIX—III S.E. (Adendan: 22° 24′-22° 12′ N.; 31° 30′-31° 45′ E.). [Topography restricted to immediate valley of the Nile.]

EGYPT. Geological Map of Egypt. 1:1,000,000 (15.78 miles to an inch). 20 colors. Survey Dept. of Egypt. Sheet 1: West Delta and Libyan Desert (32°-28° N.; 25°-31° E.). Sheet 2: East Delta and North Arabian Desert (32°-28° N.; 31°-35° E.). Sheet 3: Western Oases. (28°-24° N.; 26°-31° E.). Sheet 4: Arabian Desert (28°-24° N.; 31°-36° E.). Sheet 5: Libyan Desert (24°-20° N.; 29°-31° E.). Sheet 6: Nubian Desert (24°-20° N.; 31°-37° E.).

EGYPT. Geological Map of Egypt. 1:2,000,000 (31.56 miles to an inch). 20 colors. Survey Dept. of Egypt. [A valuable reduction of the detailed sheets of the Geological Maps of Egypt, 1:1,000,000, affording a general survey of the geology of the region between the Mediterranean and 22° N. and between the Red Sea and a line connecting the Gulf of Salum (25° E.) with Wadi Halfa, and of the southern part of the Sinai Peninsula. The same somewhat unsystematic classification of geological terranes, partly on formational, partly on petrographic grounds, is used as on the detailed sheets.]

MADAGASCAR. Carte du Pays Mahafaly. Par le Lieut. Bührer. 1:500,000 (7.89 miles to an inch). 2 colors. Illustrates paper, same name and author. *La Géogr.*, No. 6, 1910. [Surface forms shown by approximate contours with ten meter intervals. The map supplies new detail for this region.]

MOROCCO. Region de Casablanca. 1:400,000 (6.33 miles to an inch). Illustrates "Casablanca" by Lieut. Sagonds in *Bull.* Soc. de Géogr. d'Alger et de l'Afrique du Nord, 3e Trim., 1910, Algiers. [Based upon the map in 1:100,000 of the Service Géographique de l'Armée, supplemented by several itineraries. A rough idea is given of hill features. All routes centering in the seaport are shown together with the telegraph line, many elevations in meters, ruins and place names. An accompanying sheet denotes the same area as distributed in steppes, forests, and cultivated lands.]

SAHARA. D'Insalah au Niger, par l'Ahaggar. 1:2,000,000 (31.56 miles to an inch). 3 colors. Insets of Idelès and Irafok el Foghanïa in 1:15,000 and

of Tamanrasset, Ahaggar in 1:75,000. 3 colors. Illustrates "A travers le Sahara. Du Tidikelt au Niger par le Ahaggar," by N. Villatte, in *La Géogr.*, No. 3, 1911. [Gives an important amount of new detail. The itineraries are based upon 48 astronomical positions fixed.]

ASIA

ARABIA. Map of Northeast Arabia showing the routes of Capt. G. E. Leachman, 1910, and other explorers. 1:2,500,000 (39.46 miles to an inch). 3 colors. Illustrates "paper same title and author, in the *Geogr. Journ.*, Vol. 37, No. 3, March, 1911, London."

CENTRAL ASIA. (*a*) Map showing portions of Chinese Turkestan and Kansu to illustrate the exploration of Dr. M. Aurel Stein, Indian Archæological Surv., and his assistants R. B. Lal Singh and R. S. Ram Singh, 1906-08. 1:3,000,000 (47.34 miles to an inch). 3 Insets in 1:1,000,000; (*b*) Map showing portions of Kun-lun range, Chinese Turkestan. 1:1,000,000 (15.78 miles to an inch); (*c*) Map showing portions of the Western and Central Nan-Shan to illustrate the explorations of Dr. Stein and Ram Singh, 1907. 1:1,000,000. *Geogr. Journ.*, Vol. 37, No. 3, March, 1911, London. [Dr. Stein made the explorations which these maps illustrate under the orders of the Indian Government. The maps were reduced from the map in 94 sheets of the Indian Survey, which are based principally upon the plane table surveys carried on continuously during his travels by Dr. Stein and his topographical assistants. These surveys were also supplemented by astronomical observations for latitude and by triangulation. In the transcription of Turki and Iranian names, he followed the system of phonetic transliteration approved by the International Congress of Orientalists and used in a simplified form for Indian Government publications.]

DUTCH EAST INDIES. (*a*) Solor-Eilanden. Schetskaart van het Eiland Adonara. 1:200,000 (3.15 miles to an inch). 2 colors; (*b*) Schetskaart van het Eiland Lomblem. Same scale. Illustrates paper "Beschrijving der Eilanden Adonara en Lomblem, Behoorende tot de Solor-Groep." Door Kapitein J. D. H. Beckering. *Tijdsch.* kon. Nederl. Aardrijksk. Genootsch., Tweede Serie, Deel XXVIII, No. 2, Leiden, 1911. [Based upon surveys made in 1910. Approximate contours give an idea of the topography, elevations are in meters, and the nomenclature is large.]

GERMAN NEW GUINEA. Keizerin Augusta-Rivier. 1:200,000 = 3.15 miles to an inch. Black. *Tijdsch.* kon. Nederl. Aardrijksk. Genootsch., Tweede Serie, Deel XXVIII, No. 2, Leiden, 1911. [A short description of the map appears in the text. This most detailed map of the large river yet made is based upon the survey of the steamer *Pionier* in July, 1910. Numerous soundings are given together with the nature of the bordering vegetation.]

FRANCE. Cartes des Gisements de Coquilles Comestibles de la Côte du Finistère: (I) comprise entre Le Hâvre de Guisseny et Portzpoder, 1:35,000 approx. (0.55 mile to an inch), (48° 41′-48° 30′ N.; 4° 55′-4° 25′ W.); (II) comprise entre Portzpoder, et la Pte. du Petit Minou, 1:30,000 approx. (0.47 miles to an inch). (48° 30′-48° 18′ N.; 4° 50′-4° 37′ W.). Dressées par J. Guérin-Ganivet, Naturaliste attaché au Service Scientifique des Pêches au Ministère de la Marine. Accompany *Bull.* No. 203 de l'Institut Océanographique, Monaco, March, 1911, with similar title by same author. [These two maps show the distribution of edible molluscs on the N.W. coast of the Bretagne, compiled for July, 1910, and distinguish by colors nine species.]

FRANCE. Glaciers du Massif des Grandes Rousses. Carte dressée en août 1905 et 1906 au cours des campagnes glaciologiques effectueés par G. Flusin, Ch. Jacob, J. Offner. 1:10,000 (0.15 mile to an inch). Accompanies "Études glaciaires, géographiques et botaniques dans le Massif des Grandes Rousses," by the above author, published in "Études glaciologiques, Service d'Études des Grandes Forces Hydrauliques (Région des Alpes)," Ministère de l'Agriculture. 1909. [Detailed map of this massif of the French Alps in the manner of the maps published by Alpine Clubs. Rock surfaces in brown hachures, glaciers in blue contours.]

FRANCE. Schéma orographique et hydrographique du Massif des Grandes Rousses, 1:50,000 (0.79 mile to an inch), par Ch. Jacob (Planche 1); Schéma des extensions glaciaires les plus récentes dans le Massif des Grandes Rousses [1:50,000] par Ch. Jacob, (Planche II of "Études glaciaires, etc. par G. Flusin, Ch. Jacob, J. Offner," in "Études glaciologiques, Ministère de l'Agriculture," 1909.) [Drainage in blue, crest-lines and terraces in black, extension of glaciers on Planche I, in red.]

ITALY. Carta Politico-Amministrativa del Regno d'Italia colle linee ferroviarie e di navigazioni. Scala di 1:2,000,000. (31.56 miles to an inch). Istituto Geografico de Agostini, Novara. Lire 1.50. [Shows the boundaries of the provinces and their subdivisions and indicates railroads and steamship lines, canals, cable-lines. A map of a more popular type and of inferior execution, especially with regard to relief, than the majority published by this efficient firm.]

ITALY. Carta Topografica dei Dintorni di Torino. 1:50,000 (0.79 mile to an inch). Istituto Geografico de Agostini, Novara. Prezzo, Lire 1.00. [Excellent map of the environs of Turin, showing houses and built-up areas in red and the slopes of the Monferrato Hills in contours and shading.]

ITALY. Carta Fisico-Politica delle 69 Province Amministrative del Regno d'Italia. 1:3,000,000 (47.34 miles to an inch). Istituto Geografico de Agostini, Novara. Prezzo, L. 0.30. [In spite of its title, this is purely a political map showing, by colors, the extent of the political subdivisions of Italy.]

ITALY. Pianta di Torino. 1:10,000 (1.15 mile to an inch). 5 colors. Istituto Geografico de Agostini, Novara, 1910. L. 1. [A fine map of Turin with accompanying descriptive text and an index which facilitates finding buildings, streets or places.]

ITALY. Dintorni di Roma. 1:250,000 (3.95 miles to an inch). 5 colors. Istituto Geografico de Agostini, Novara. L. 0.50. [An excellent map of Rome and its environment, topographically colored, with communications prominently indicated and a large nomenclature.]

ITALY. Pianta di Roma. 1:12,000 (0.18 mile to an inch). Istituto Geografico de Agostini, Novara. Accompanies 'Guida di Roma e Dintorni." [A city map of the highest quality and artistic execution. Delineates built-up areas, using separate symbols for public buildings and monuments of antiquity. It is divided into three strips to facilitate consultation.]

POLAR

WEST ANTARCTICA. Maps to illustrate paper by Dr. J. B. Charcot on the French Antarctic Expedition 1908-1910. (*a*) After the Expedition of the "Belgica" 1898, and before the expedition of the "Français," 1903-1905; (*b*) After the Expedition of the "Français," 1903-1905; (*c*) After the First summer voyage of the "Pourquoi Pas?", 1908-1909; (*d*) After the second summer voyage of the "Pourquoi Pas?", 1909-1910. 1:5,000,000 (78.9 miles to an inch). 3 colors. Illustrates "The Second French Antarctic Expedition," by Dr. J. B. Charcot, in *Geogr. Journ.*, Vol. 37, No. 3, March 1911, London. [This series well illustrate the large amount of geographical information which the two Charcot Expeditions added to our maps. The maps show the results of his surveys of islands, and the mainland coast line, his determination of many heights and depths and his discovery of new land in 70° S. Lat.

ATLASES

Atlante Geografico Muto, fisico-politico a colori. 25 plates. Istituto Geografico de Agostini, Novara, 1910. L. 2.25. [An excellent series of sheets, blue tints used to show sea depths, shades of brown and green for elevations, and red lines for political boundaries. Hydrography is well outlined and all physical detail is expressed very clearly considering the small scale of the maps. A fine example of the superior map work which this establishment is producing under the supervision of Prof. Dr. G. de Agostini.]

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